

**BEFORE  
THE PUBLIC SERVICE COMMISSION OF  
SOUTH CAROLINA**

**DOCKET NO. 2023-388-E**

In the Matter of:	)	
	)	<b>DIRECT TESTIMONY OF</b>
Application of Duke Energy Carolinas,	)	<b>JESSICA L. BEDNARCIK FOR</b>
LLC For Authority to Adjust and Increase	)	<b>DUKE ENERGY CAROLINAS, LLC</b>
its Electric Rates and Charges	)	

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**I. INTRODUCTION**

**Q. PLEASE STATE YOUR NAME, BUSINESS AFFILIATION, BUSINESS ADDRESS AND CURRENT POSITION.**

A. My name is Jessica L. Bednarcik. My business address is 525 South Tryon Street, Charlotte, North Carolina, 28202. I am employed by Duke Energy Business Services, LLC, as Senior Vice President, Environmental, Health and Safety (“EHS”), Coal Combustion Products (“CCP”) and Enterprise Technical Training. As more fully discussed below, my responsibilities include providing governance and operations leadership to Duke Energy Corporation’s (“Duke Energy”) regulated operating companies. In this docket, I am testifying on behalf of one of those operating companies, Duke Energy Carolinas, LLC (“DEC” or the “Company”), regarding recovery of the costs the Company has incurred in connection with coal ash, or coal combustion residuals (“CCR”).

**Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.**

A. I received my Bachelor of Science degree in Chemical Engineering from Clemson University in 2001. I am a registered Professional Engineer in South Carolina and North Carolina, and I am a Certified Project Management Professional through the Project Management Institute.

From 2001 through 2002, I was an Associate Engineer for Duke/Fluor Daniel (Charlotte, North Carolina). In that role, I designed processes for new combined cycle power generation plants, with a focus on water treatment. From 2003-2004, as an Associate Engineer for Southerland Associates (Charlotte,

1 North Carolina), I worked on numerous design engineering projects. From 2004  
2 through 2005, as an Associate Engineer for WPC, Inc. (Charlotte, North  
3 Carolina), my responsibilities included environmental compliance and design.

4 In 2005, I joined the Environmental Engineering group at Duke Energy,  
5 which became the Waste and Remediation Management Group after the Duke  
6 Energy merger with Cinergy Corporation in 2006. In 2013, after the merger  
7 with Progress Energy, I became Manager of the Remediation and  
8 Decommissioning Group at Duke Energy, and my responsibilities included  
9 management of environmental aspects of decommissioning coal fired power  
10 plants. From January 2015 to August 2016, I was the Director of  
11 Environmental, Health and Safety Risk and Compliance Assurance.

12 From September 2016 to July 2018, I held the position of Special  
13 Assignment Leader in the EHS department and managed the provision of  
14 permanent water associated with the North Carolina House Bill 630 (revision  
15 of the North Carolina Coal Ash Management Act (“CAMA”)). From August  
16 2018 to February 2019, I was the Senior Director of Grid Assurance. From  
17 March 2019 to April 2021, I was the Vice President of Coal Combustion  
18 Products (“CCP”) Operations, Maintenance and Governance. In this role, I was  
19 responsible for regulatory affairs, operations support, and other centralized  
20 functions pertaining to the storage and disposal of coal ash generated by the  
21 Company’s coal-fired generation fleet as a by-product of the generation of  
22 electricity. My team worked to define, establish, and maintain fleet CCP  
23 standards, programs, processes, and best practices within functional areas for

1 all fossil plant sites. The team also oversaw site operations and maintenance  
2 (“O&M”) of CCP units, including high-hazard dam operations and  
3 maintenance, production landfills, decommissioning and demolition, and  
4 byproducts management. In May 2021, I became the Senior Vice President of  
5 EHS and CCP, with the Enterprise Technical Training responsibilities being  
6 added to my responsibilities in January 2023.

7 **Q. WHAT ARE YOUR PRIMARY RESPONSIBILITIES AS THE SENIOR**  
8 **VICE PRESIDENT OF EHS, CCP, AND ENTERPRISE TECHNICAL**  
9 **TRAINING?**

10 A. In my current role, I lead the groups responsible for developing and advancing  
11 corporate policies, programs, training, and strategies to ensure Duke Energy’s  
12 (including the Company’s) compliance with environmental, health and safety  
13 laws and regulations. In addition, I am responsible for leading the functions to  
14 safely operate, develop and implement closure plans for all of Duke Energy’s  
15 coal ash basins.

16 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION**  
17 **OR OTHER STATE PUBLIC UTILITY COMMISSIONS?**

18 A. I previously provided written testimony before the Public Service Commission  
19 of South Carolina (“Commission”) on behalf of Duke Energy Progress, LLC  
20 (“DEP”) in Docket No. 2022-254-E (“DEP-SC 2022 Rate Case”). In addition,  
21 I filed direct and rebuttal testimony on behalf of DEP and DEC in their North  
22 Carolina rate cases, Docket Nos. E-2, Sub 1219 and E-7, Sub 1214,  
23 respectively. I appeared before the North Carolina Utilities Commission in



1 connection with both of those cases. My testimony concerned DEP and DEC's  
2 recovery of costs incurred by the companies to comply with environmental  
3 regulations relating to the storage and disposal of CCR.

4 **Q. HOW IS YOUR TESTIMONY ORGANIZED?**

5 A. In Section I, in addition to information regarding my background and expertise,  
6 I have provided an overview of my testimony as well as the testimony of other  
7 witnesses presenting the Company's coal ash cost recovery case.

8 In Section II, I provide general observations and overarching  
9 conclusions concerning the Company's CCR sites, demonstrating that the  
10 federal CCR Rule requires closure at each site, and that the closure  
11 methodology employed by the Company and approved by the applicable  
12 environmental authority is consistent with federal law. I also support my  
13 opinion that the costs incurred in connection with the Company's basin closure  
14 activities are reasonable and prudent.

15 In Section III, I provide detailed descriptions of each site, the closure  
16 activities undertaken since September 1, 2018, as well as the costs incurred. I  
17 describe the site-specific conditions that led to required basin closure and  
18 demonstrate that the activities executed at each site are appropriate, cost-  
19 effective, and prudent in light of site-specific conditions.

20 In Section IV, I show why pre-September 1, 2018, costs provisionally  
21 disallowed by the Commission in the Company's previous rate case should be  
22 recovered.

1 I demonstrate in my testimony that the CCR costs sought for recovery  
2 in this case were reasonably and prudently incurred by DEC in order to meet its  
3 obligations under applicable environmental laws and regulations. Compliance  
4 with these legal requirements is mandatory for the Company. Accordingly, the  
5 Company is entitled to recovery of the coal ash basin closure costs which it  
6 seeks in this proceeding.

7 **Q. PLEASE PROVIDE A SUMMARY OF YOUR TESTIMONY.**

8 A. My testimony is presented to support cost recovery for activities undertaken by  
9 the Company in connection with closure of its coal ash management units,  
10 including basins<sup>1</sup> and landfills. Closure of each of the Company's coal ash  
11 basins for which cost recovery is sought in this proceeding is mandated by  
12 federal law, in particular, a rule promulgated by the federal Environmental  
13 Protection Agency ("EPA" or the "Agency") on April 17, 2015, with an  
14 effective date of October 19, 2015 (as subsequently amended, the "CCR Rule"  
15 or "Rule").

16 A detailed discussion of the federal CCR Rule is set out in the testimony  
17 of Witness Marcia Williams. As she indicates, except in states that have  
18 received EPA approval to implement it, the CCR Rule is self-implementing,  
19 meaning that regulated entities subject to its provisions are simply expected to  
20 comply with those provisions. As Witness Williams further describes, CCR  
21 units that fail to comply with the self-implementing requirements or that result

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<sup>1</sup> In my testimony, I also refer to the Company's coal ash basins as "ponds" and "surface impoundments." For purposes of my testimony, these terms are used interchangeably.

1 in an imminent and substantial risk to health and the environment are subject to  
2 citizen suits. In addition, there is always the threat of enforcement action by  
3 applicable federal and state regulatory authorities, particularly after the passage  
4 of the Water Infrastructure Improvements for the Nation Act (“WIIN Act”) in  
5 2016. The WIIN Act gives EPA immediate, direct enforcement authority and  
6 requires states to establish permit programs in order to implement the CCR Rule  
7 in lieu of EPA. The WIIN Act also requires the EPA to develop a federal CCR  
8 permit program, conditioned on funding, in those states that do not adopt and  
9 receive federal approval for their own CCR permit programs.

10 The Rule establishes a broad set of minimum federal requirements for  
11 CCR units. But, as Witness Williams notes, the states retain responsibility to  
12 regulate CCR units, either under their delegated authority to enforce federal  
13 statutes (*e.g.*, the Clean Water Act, or the Resource Conservation and Recovery  
14 Act) or under specific state laws and regulations that overlap with, complement,  
15 and/or supplement federal regulation, including the CCR Rule. In South  
16 Carolina, the applicable state-specific laws include the South Carolina Solid  
17 Waste Policy and Management Act (a solid waste law) and the South Carolina  
18 Pollution Control Act (a water quality law); in North Carolina, the applicable  
19 state-specific laws include the CAMA<sup>2</sup> and Solid Waste and Water Regulations.  
20 This federal-state partnership is also described in Witness Williams’ testimony.

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<sup>2</sup> Note, however, that CAMA only applies to the Company’s North Carolina ash basins – other CCR units or facilities, such as ash landfills, are not subject to CAMA.

1           The CCR units for which cost recovery is sought in this proceeding are  
2           located at the following plants owned and operated (or formerly operated, in the  
3           case of a retired plant) by the Company: W.S. Lee Steam Station, located in  
4           Belton, South Carolina (“W.S. Lee”); Allen Steam Station, located in Belmont,  
5           North Carolina (“Allen”); Belews Creek Steam Station, located in Walnut Cove,  
6           North Carolina (“Belews Creek”); Cliffside Steam Station, located in  
7           Mooresboro, North Carolina (“Cliffside”)<sup>3</sup>; Marshall Steam Station, located in  
8           Terrell, North Carolina (“Marshall”); Buck Steam Station, located in Salisbury,  
9           North Carolina (“Buck”); and Dan River Steam Station, located in Eden, North  
10          Carolina (“Dan River”).<sup>4</sup>

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<sup>3</sup> The Cliffside Steam Station is also referred to as the Rogers Energy Complex. While I utilize “Cliffside” in my testimony, figures and other documents provided in the course of this hearing may refer to the site as “Rogers.”

<sup>4</sup> The CCR Rule, as promulgated, does not apply to the legacy CCR impoundments at the Company’s Riverbend Steam Station, located in Mount Holly, NC (“Riverbend”). However, in order to comply with a court ruling that held that excluding legacy basins from regulation was unlawful, EPA initiated a rulemaking in 2020 to bring these basins within coverage of the CCR Rule. *See* 85 Fed. Reg. 65015. EPA stated that it “anticipates that many or all legacy CCR surface impoundments will be found to be unlined, and thus will be required to close.” *Id.* at 65019. In May 2023, EPA published a proposed revised rule that incorporated legacy CCR surface impoundments, as well as other CCR management units, regardless of how or when the CCR was placed. *See* 88 Fed. Reg. 31982. It is anticipated that a final rule will be issued in 2024.

In the Company’s previous rate case (Docket No. 2018-319-E), the Commission disallowed costs associated with the closure of the Riverbend basins based upon the testimony of ORS Witness Wittliff, who explained that the basins were not covered by the CCR Rule, but who also stated that “should the EPA later decide to regulate the basins at Riverbend, DEC *could then* seek to recover those costs in rates from South Carolina Customers.” (Order No. 2019-323 (“2019 PSC Order”) at 49 (emphasis added)). The legacy surface impoundments at Riverbend were unlined, and the proposed revised rule published by EPA appears to include basins such as those at Riverbend. While the Company is not seeking costs associated with the closure of those CCR ponds in this proceeding, it will seek recovery of closure costs for those basins if the revised, effective CCR Rule requires closure of basins such as Riverbend to be in accordance with the CCR Rule. Costs associated with closure of the Riverbend basins will continue to be deferred in accordance with the orders and practices of the Commission.

In each instance, the applicable CCR facility is being closed by excavation, that is, by removal of the coal ash stored or disposed of in the facility. The costs sought to be recovered (by plant) are set forth in the following table. The middle column of the table provides costs presented at the *system level* – that is, costs incurred in order to comply with applicable environmental regulation for the benefit of the multi-state electric system owned and operated by the Company, a system that has provided safe, reliable, cost-effective, and increasingly clean electricity for decades to the Company’s customers, be they South Carolina retail customers, North Carolina retail customers, or wholesale customers. However, in order to provide additional guidance to the Commission, the last column of the table provides the costs sought to be recovered from South Carolina retail customers, using the allocation factors for South Carolina retail. As in the previous case, costs associated with providing bottled water and/or drinking water supplies to homeowners have been removed from the calculations below.

**Table 1: Compliance Spend (in millions)**

<b>Site</b>	<b>Compliance Spend (Actual 9/18-9/23 &amp; Forecast 10/23-12/23<sup>5</sup>) System Level</b>	<b>Compliance Spend (Actual 9/18-9/23 &amp; Forecast 10/23-12/23) SC Retail Level</b>
Allen	\$120	\$28
Belews Creek	\$137	\$33
Buck	\$241	\$57
Cliffside	\$126	\$30

<sup>5</sup> In the Company’s prior rate case, it sought recovery of costs incurred with respect to CCR storage areas closure prior to September 1, 2018. Forecasted amounts will be updated with actuals in a supplemental filing of Witness Jiggetts.

Dan River	\$76	\$18
Marshall	\$204	\$48
W.S. Lee	\$89	\$21
<b>Total</b>	<b>\$994</b>	<b>\$235</b>

1 Additional site-by-site detail related to these costs, as well as descriptions of the  
2 activities that generated the costs, are provided in Section III of my testimony.

3 **Q. PLEASE PROVIDE GENERAL CONTEXT FOR THE COMPANY'S**  
4 **CLOSURE STRATEGIES AT THESE SITES.**

5 A. While this is addressed in detail later in my testimony and in the testimony of  
6 Witness Williams, the primary driver for the Company's chosen closure  
7 strategy selected for each basin for which recovery is sought in this proceeding  
8 is that each basin site has coal ash in contact with groundwater. The state-level  
9 environmental agencies whose lead the Company must follow – in South  
10 Carolina, the South Carolina Department of Health and Environmental Control  
11 ("DHEC") and in North Carolina, an agency now known as the Department of  
12 Environmental Quality ("DEQ") – have both adamantly insisted that when ash  
13 is in contact with groundwater and given the site-specific geography at each of  
14 the Company's plants, the ash must be excavated. These agencies have not  
15 singled out DEC in this regard. In South Carolina, *all* CCR facilities, whether  
16 owned by DEC, DEP, or other South Carolina utilities – South Carolina Gas &  
17 Electric, now Dominion-South Carolina ("SCE&G" or "Dominion-SC"), and  
18 South Carolina Public Service Authority ("Santee Cooper"), which is owned by  
19 the State – are being closed by excavation under the supervision of DHEC. In  
20 North Carolina, *all* CCR facilities, whether owned by DEC or DEP (the only

1 electric utilities with CCR basins in the State) are being closed by excavation  
2 under the supervision of DEQ.

3 Moreover, as further detailed in my testimony and in the testimony of  
4 Witness Williams, since the Company's last rate case was decided in 2019 EPA  
5 has also clarified that the ash-in-contact-with-groundwater condition, if it exists  
6 at a CCR site, must be addressed with stringent (and often very costly)  
7 engineering controls to ensure that, if not excavated, the ash left in place and  
8 groundwater are separated and, in the words of the CCR Rule itself, the closure  
9 is executed so as to "[c]ontrol, minimize or eliminate, to the maximum extent  
10 feasible, post-closure infiltration of liquids into the waste and releases of CCR,  
11 leachate, or contaminated run-off to the ground or surface waters or to the  
12 atmosphere." EPA is thus fully aligned with the requirements imposed upon  
13 DEC by DHEC and DEQ, and this regulatory alignment is a major factor in the  
14 Company's closure strategy.

15 Once ash is excavated, there are choices available for its disposition – it  
16 can be landfilled, either off-site or, if circumstances permit, on-site, or it can be  
17 beneficiated, that is, processed into a useable product. Except for Buck, an on-  
18 site landfill is feasible at each of the plant sites at issue in this case and disposal  
19 to an on-site landfill is the Company's chosen method of closure for those sites.  
20 This covers W.S. Lee, Allen, Belews Creek, Dan River, Cliffside, and Marshall.

21 I note that in the DEP-SC 2022 Rate Case, the Office of Regulatory Staff  
22 ("ORS") supported cost recovery associated with disposal of CCR to an on-site  
23 landfill. Specifically, in that case ORS Witness Dan J. Wittliff ("Witness

1 Wittliff”) stated that excavation to an on-site landfill was a closure methodology  
2 compliant with the CCR Rule. *See* Transcript of the Deposition of Dan J.  
3 Wittliff (“Wittliff Dep. Tr.”) at pp. 47-48 (referencing DEP’s Sutton site) and  
4 62-63 (referencing DEP’s Robinson, Roxboro, and Mayo sites).<sup>6</sup> Based upon  
5 this testimony by its own expert witness, ORS did not challenge basin closure  
6 costs at these sites.

7 DEC’s W.S. Lee site, like DEP’s Robinson site, is located in South  
8 Carolina. The same site conditions that led DHEC to insist on closure-by-  
9 excavation at Robinson apply to W.S. Lee. In addition, the basins at DEC’s  
10 Allen, Belews Creek, Cliffside and Marshall sites are comparable, in terms of  
11 their site-specific characteristics, to the basins at DEP’s Roxboro and Mayo  
12 sites. Those site-specific characteristics led DEQ to insist upon closure by  
13 excavation at all six of these sites. And finally, DEC’s Dan River and DEP’s  
14 Sutton sites are also comparable.

15 Accordingly, based upon ORS’s position supporting cost recovery in the  
16 DEP-SC 2022 Rate Case, we expect that ORS will also support cost recovery  
17 in connection with DEC’s activities at the W.S. Lee, Allen, Belews Creek,  
18 Cliffside, Dan River and Marshall sites.

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<sup>6</sup> The deposition transcript was filed in the DEP-SC 2022 Rate Case docket on December 14, 2022.



1   **Q.   YOUR DISCUSSION ABOVE COVERS EACH OF DEC'S SITES**  
2       **EXCEPT FOR BUCK. PLEASE FURTHER DESCRIBE THE**  
3       **CONTEXT FOR THE COMPANY'S CLOSURE STRATEGY AT BUCK.**

4   A.   An on-site landfill at Buck is infeasible, for reasons that are further detailed  
5       later in my testimony. Thus, available disposal options at Buck are an off-site  
6       landfill or through beneficiation. At Buck, the chosen closure strategy is  
7       removal and beneficial reuse. Ash excavated from the Buck ponds is  
8       beneficiated in an on-site plant utilizing STAR® technology developed by a  
9       South Carolina company, SEFA Group, and previously implemented at sites  
10      owned and operated by Santee Cooper. STAR® technology is a carbon-burnout  
11      process that allows the ash to be sold for use as an additive in concrete. Revenue  
12      from sales offsets a portion of the cost to operate the STAR® facility. In fact,  
13      since the Buck STAR® started operation in 2020, revenue from the beneficiated  
14      ash has increased approximately 10%. It is anticipated the need to beneficially  
15      reuse ash from basins and/or landfills will continue to increase as coal plants  
16      continue to retire.

17   **Q.   HOW IS BENEFICIAL REUSE OF CCR PERCEIVED BY EPA AND**  
18       **THE STATE OF SOUTH CAROLINA?**

19   A.   While CCR beneficial reuse is not mandated by the EPA under the CCR Rule,  
20       it is recognized by EPA as a positive attribute. In the preamble to the Federal  
21       Rule, EPA reaffirms its previous conclusion that beneficial use of CCR can

1 offer significant environmental benefits.<sup>7</sup> Those economic benefits have  
 2 certainly materialized for the State of South Carolina (as I indicate above, the  
 3 creator of STAR® technology is a South Carolina company, SEFA Group), and  
 4 the State has embraced beneficial reuse wholeheartedly. For example, the  
 5 following appears in a Charleston *Post & Courier* article published as far back  
 6 as 2017:

7 Today, every unlined coal ash lagoon in South Carolina has  
 8 either been excavated, is being excavated or is scheduled to be  
 9 excavated for transportation to dry, lined landfills or for use in  
 10 recycling.

11 The rest of the South is lagging – about 40 million tons of coal  
 12 ash in five other states will be excavated while another 250  
 13 million tons will be left in place, the alliance said. “South  
 14 Carolina as a state – and particularly Santee Cooper and SCE&G  
 15 – are leaders in the region, if not in the country, in coal ash  
 16 cleanups,” Holleman said. “Our rivers are cleaner and our  
 17 communities are safer because of that.”

18 More than an environmental victory, the coal ash cleanup has  
 19 been an economic boon.

20 “It’s good for the environment, it’s good for our customers and  
 21 it’s good for the economy because it’s providing and sustaining  
 22 jobs,” Santee Cooper spokeswoman Mollie Gore said.

23 Lexington-based SEFA Group, for example, has invested \$40  
 24 million in a Georgetown plant that recycles wet ash into a  
 25 product that’s sold to concrete manufacturers.

26 “Pretty much any concrete you see poured in the state of South  
 27 Carolina, if the ash is available, it’s in it,” Jim Clayton, SEFA’s  
 28 chief operating officer, said of the company’s product. Concrete

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<sup>7</sup> “The beneficial use of CCR is a primary alternative to current disposal methods. And as EPA has repeatedly concluded, it is a method that, when performed correctly, can offer significant environmental benefits, including greenhouse gas (GHG) reduction, energy conservation, reduction in land disposal (along with the corresponding avoidance of potential CCR disposal impacts), and reduction in the need to mine and process virgin materials and the associated environmental impacts.” 80 Fed. Reg. 21,302, 21,329 (Apr. 17, 2015).

1 made with SEFA's recycled product is stronger and more durable  
 2 than traditional concrete and has been used for large scale  
 3 projects like the Ravenel Bridge in Charleston.

4 David Wren, *South Carolina Utilities Lead the Region in Efforts to Clean up*  
 5 *Coal Ash Pollution*, Post & Courier, Jul. 15, 2017.<sup>8</sup>

6 **Q. PLEASE EXPLAIN FURTHER SOUTH CAROLINA'S ATTITUDE**  
 7 **TOWARDS CCR BENEFICIAL REUSE.**

8 A. As the *Post & Courier* article notes, South Carolina has been a national leader  
 9 with respect to beneficial reuse of coal ash. A recent example of this, one that  
 10 exemplifies the State's support for ash recycling, is Dominion-SC's most recent  
 11 rate case, filed in 2020, Docket No. 2020-15-E (2020 Dominion-SC Rate Case).

12 The 2020 Dominion-SC Rate Case included a description of the utility's  
 13 coal ash basin closure activities in the direct testimony of Dominion-SC witness  
 14 W. Keller Kissam ("Witness Kissam"), filed in the Docket on September 4,  
 15 2020. There, beginning on page 22 of the testimony, Witness Kissam noted that  
 16 Dominion-SC had "in furtherance of its commitment to environmental  
 17 stewardship ... acted proactively to deal with legacy coal ash issues."  
 18 Describing further Dominion-SC's efforts with respect to one of its basins (the  
 19 Wateree Ash Pond), Witness Kissam states that the project was commenced in  
 20 2016 and completed in November 2019, and resulted in "more than 3.5 million  
 21 cubic yards of ash ... [being] removed from an ash pond adjacent to a major  
 22 river and either recycled or placed dry in a lined landfill." *Id.*, page 24.

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<sup>8</sup> Available at [https://www.postandcourier.com/business/south-carolina-utilities-lead-the-region-in-efforts-to-clean-up-coal-ash-pollution/article\\_bcfb1eec-670a-11e7-a2ea-e778e26af132.html](https://www.postandcourier.com/business/south-carolina-utilities-lead-the-region-in-efforts-to-clean-up-coal-ash-pollution/article_bcfb1eec-670a-11e7-a2ea-e778e26af132.html).

1           The 2020 Dominion-SC Rate Case was settled by the parties, with the  
2           settlement being approved by the Commission. No disallowance of coal ash  
3           costs incurred by Dominion-SC was advocated by ORS or imposed by the  
4           Commission.

5   **Q.   IN HAVING PROVIDED SOME OVERALL CONTEXT TO THE**  
6           **COMPANY’S COAL ASH CASE, PLEASE BRIEFLY DESCRIBE THE**  
7           **COAL ASH-RELATED TESTIMONY THE COMPANY IS**  
8           **PRESENTING FROM OTHER WITNESSES.**

9   A.   I have already alluded to the testimony of Witness Williams – in general, her  
10       testimony describes the federal-state partnership with respect to CCR  
11       regulation. It also provides a detailed description of the CCR Rule and the  
12       performance standards that must be met in connection with CCR basin closure,  
13       particularly when ash in the basin is in contact with groundwater and when the  
14       basin is affected by other site-specific conditions that may make it difficult if  
15       not impossible, practically speaking, to close the basin but leave the ash in  
16       place. Witness Williams concludes that when applying the site-specific  
17       conditions detailed in my testimony to her analysis of federal CCR  
18       requirements, closure by removal is consistent with the CCR Rule irrespective  
19       of the requirements of any applicable state laws. In addition, Witness Williams  
20       indicates that EPA has consistently supported beneficial reuse of all types of  
21       waste materials when done in an environmentally safe manner.

22           The alternative to closure by excavation is to close-in-place, that is to  
23       leave the ash in place but to “cap” it in a way that is designed to prevent

1 infiltration of water into and through ash left in the basin. Witness Williams's  
2 explanation of the CCR Rule's performance standards shows that this would be  
3 extremely difficult given the site-specific conditions at each of the Company's  
4 basins and would require extensive engineering controls. The Company  
5 retained Burns & McDonnell, an engineering firm with extensive experience in  
6 CCR basin closure, to perform a cost analysis of a closure-in-place strategy,  
7 given the engineering controls that would be necessary at each North Carolina  
8 basin site. Burns & McDonnell produced a report, attached as an exhibit to the  
9 testimony of Witness Mark D. Rokoff, detailing the results of its analysis. For  
10 Buck, where an on-site landfill is infeasible, we asked Burns & McDonnell to  
11 provide an estimate for off-site ash disposal, the other available option. We also  
12 asked Burns & McDonnell to prepare a closure-in-place estimate for Buck.

13 The Company updates, on an annual basis, its closure-by-removal cost  
14 estimates for each site. Estimates take into account items such as commodity  
15 prices, updated bids, as well as factors such the sales prices for beneficially  
16 reused ash. The comparison of projected costs actually being incurred to the  
17 Burns & McDonnell estimates is set out in the following table (all dollar figures  
18 rounded and on a system basis):

**Table 2: Cost Comparison of Closure Methods (in millions)**

Site	Burns & McDonnell Estimate – Close-in-Place, with Engineering Controls, except Buck #1	Company Estimate – Close-by-Removal 3Q2023
Allen	\$842	\$514
Belews Creek	\$948	\$344
Cliffside <sup>9</sup>	\$485	\$271
Dan River	\$219	\$198 (actual)
Marshall	\$1,199	\$534
Buck #1 (off-site disposal)	\$811	\$473
Buck #2 (close-in-place)	\$471	

Finally, the Company is also presenting the testimony of Witness Steven M. Fetter, an expert on regulatory policy, whose testimony approaches the issue of coal ash cost recovery from that perspective, rather than the environmental/engineering perspectives presented by Witnesses Williams and Rokoff, as well as in my own testimony. From the perspective of regulatory policy, even recognizing that in the Company's prior case the Commission denied recovery of prudently incurred costs that it categorized as non-CCR Rule costs, Witness Fetter concludes that denial of cost recovery on that basis is contrary to sound regulatory policy. Witness Fetter concludes further that costs prudently incurred are recoverable – and should be recovered – regardless of which jurisdiction's law results in the imposition of a system cost.

<sup>9</sup> The Burns & McDonnell estimate for Cliffside does not include any costs associated with the closure of the ash basin for Units 1-4, which were excavated by the Company to support the installation of a new water treatment system. Costs for excavation of this basin *are* included in the Company's estimates (the third column of Table 2). Thus, the Company's estimates for closure by removal for the Cliffside site as a whole are lower than the Burns & McDonnell estimates for closure-in-place of only the Cliffside Unit 5 Inactive Ash basin and the Active Ash basin.

1                   **II. GENERAL OBSERVATIONS AND CONCLUSIONS CONCERNING**  
2                   **CLOSURE OF THE COMPANY'S CCR UNITS AND THE**  
3                   **REASONABLENESS AND PRUDENCE OF THE COSTS INCURRED**

4   **Q.     PLEASE PROVIDE A SUMMARY OVERVIEW OF THIS SECTION OF**  
5           **YOUR TESTIMONY.**

6   A.     In addition to expressing my conclusions concerning the reasonableness and  
7           prudence of DEC's costs, I make four basic points:

8                 First, every one of the Company's ash basins for which cost recovery is  
9                 sought in this case is required by the CCR Rule to close – that is, independent  
10                of any state-specific regulation, all costs incurred with respect to basin closure  
11                were incurred because the CCR Rule mandates basin closure.

12               Second, all of the ash basins for which closure costs are being sought  
13               for recovery in this case, contain ash in contact with groundwater – that is, the  
14               base of those ash impoundments is below the water table in the vicinity of the  
15               impoundment. According to the EPA this is one site-specific criteria that is  
16               critical to determine the appropriate closure methodology. Details concerning  
17               the depths of saturated ash at each of these basins are provided in site-by-site  
18               descriptions in Section III.

19               Third, each of the environmental regulatory agencies – federal and state  
20               – whose authority and/or regulation governs the Company's activities for the  
21               CCR closure actions included in this matter have indicated concerns regarding  
22               the environmental impact of ash in contact with groundwater, and/or other site-  
23               specific conditions, and these have compelled those agencies to favor, under the  
24               site-specific conditions of each of the Company's CCR sites, removal of the ash

1 in connection with closure of the basins. Thus, all the environmental authorities  
2 to which the Company is subject are aligned in favor of closure-by-removal in  
3 light of the site-specific conditions at the Company's ash basins.

4 Fourth, as a result of this regulatory alignment and the site-specific  
5 conditions, closure-by-removal, *i.e.*, excavation, is the most prudent and cost-  
6 effective closure method consistent with the requirements of the CCR Rule, and  
7 is the method approved by the applicable regulatory authority in each instance.

8 **Q. AS BACKGROUND, PLEASE PROVIDE AN OVERVIEW OF THE**  
9 **COMPANY'S COAL-FIRED GENERATION AND RELATED CCR**  
10 **UNITS.**

11 A. For decades, coal was the "go-to" fuel choice for baseload, least-cost reliable  
12 service. Historically in South Carolina and North Carolina, the Company  
13 operated eight coal-fired plants, identified earlier in my testimony. Coal-fired  
14 generation continues to this day at Allen, Belews Creek, Cliffside and Marshall.  
15 The coal-fired plants at the other sites have been retired. New gas-fired units  
16 have replaced the retired coal-fired units at Buck, Dan River, and W.S. Lee.

17 Coal ash is a byproduct of coal-fired generation. Accordingly, a  
18 necessary component of any coal-fired generation facility is the proper disposal  
19 and management of the CCR that remains after burning coal. Over time and  
20 consistent with industry standards and applicable environmental regulations,  
21 the Company constructed, maintained, and utilized a combination of surface  
22 impoundments, or ash basins, and landfills to manage CCR that was generated  
23 from providing electricity to South Carolina and North Carolina customers.



1           Until the 1950s, much of the CCR was emitted through the plants’  
2           smokestacks or, in the case of bottom ash, manually removed from boilers and  
3           disposed of in landfills. With the advent of clean air regulation, in regions of  
4           the country with abundant water resources, like the Southeast, the industry  
5           transitioned to a water sluice to remove ash from boilers and to clean the  
6           electrostatic precipitators, preventing ash from being emitted through the  
7           smokestacks. This effluent was then diverted to ash basins. In other words, in  
8           many cases, ash basins were actually created or relied upon to implement earlier  
9           environmental regulations.

10           The Clean Water Act of 1972 and the subsequent creation of the  
11           National Pollutant Discharge Elimination System (“NPDES”) permitting  
12           system confirmed wet ash handling and ash basins as the primary lawful and  
13           effective way for electric utilities in the Southeast to address CCR management  
14           and environmental requirements. Ash basins were permitted wastewater  
15           treatment units regulated by the relevant state environmental agencies – in  
16           South Carolina, DHEC and in North Carolina, DEQ – under authority delegated  
17           by the EPA pursuant to the Clean Water Act.

18   **Q.   HOW DID THE CCR RULE IMPACT THE COMPANY’S COAL ASH**  
19   **UNITS?**

20   A.   The CCR Rule built on general minimum criteria for solid waste management  
21           units first promulgated in 1979, establishing national minimum criteria  
22           specifically covering CCR surface impoundments and landfills that consist of:  
23           (1) closure requirements and post-closure care; (2) design and operating

1 criteria; (3) groundwater monitoring and corrective action; (4) location  
2 restrictions; (5) recordkeeping; (6) notification; and (7) internet posting  
3 requirements. However, the CCR Rule does not provide a one-size-fits-all  
4 framework for complying with its requirements and contemplates robust  
5 coordination with state environmental regulators, including consideration of  
6 public input. Accordingly, the Company has tailored its CCR Rule compliance  
7 strategy to address site-specific conditions, in keeping with direction from its  
8 state-level environmental regulators, DHEC and DEQ.

9 **Q. DOES THE CCR RULE REQUIRE CLOSURE OF EACH OF THE**  
10 **COMPANY'S ASH PONDS FOR WHICH COST RECOVERY IS**  
11 **SOUGHT IN THIS PROCEEDING?**

12 Yes. The Rule mandates closure of all existing CCR surface impoundments that  
13 are unlined or clay-lined and/or do not meet any one of five location restrictions.

14 The location restrictions require closure for existing CCR surface  
15 impoundments that are placed (1) within a certain distance of the uppermost  
16 aquifer; (2) in wetlands; (3) in fault areas; (4) in seismic impact zones; and (5)  
17 in unstable areas. Criterion (1), the aquifer restriction, requires that existing  
18 CCR surface impoundments be “constructed with a base that is located no less  
19 than 1.52 meters (five feet) above the uppermost aquifer or make a technical  
20 demonstration that there will not be a hydraulic connection between the base of  
21 the CCR unit and the uppermost aquifer.” 40 CFR § 257.60. *Every one of the*  
22 *Company's ash basins for which cost recovery is sought in this case is located*  
23 *within five feet of the uppermost aquifer – meaning that every one of those*

1        *basins is required by the CCR Rule to close.* The Company seeks recovery of  
2        the South Carolina retail share of the costs incurred in connection with this  
3        federally mandated closure.

4                In addition to placement within five feet of the uppermost aquifer, seven  
5        of the individual basins (at W. S. Lee, Marshall, Cliffside, Belews Creek and  
6        Buck) also fail to meet the wetlands restriction. The failure to meet these criteria  
7        impacts decisions on closure methodology and cost. Finally, all of the existing  
8        surface impoundments are unlined, and therefore require closure under the CCR  
9        Rule.

10    **Q.    DOES THE CCR RULE MANDATE ANY SPECIFIC METHOD OF**  
11    **CLOSURE?**

12    A.    No. The Rule permits two basic closure methodologies: (1) “closure through  
13        removal of the CCR” (*i.e.*, excavation), or (2) “closure by leaving ash in place”  
14        (*i.e.*, cap-in-place, or closure-in-place). However, the choice employed at any  
15        particular site is based upon site-specific conditions and approvals (where  
16        applicable) from state regulatory agencies. Closure-by-removal could be to a  
17        permitted landfill (either on-site or off-site) or for beneficial reuse. Cap-in-place  
18        requires that the closure is executed in a manner that will

19                Control, minimize or eliminate, to the maximum extent  
20        feasible, post-closure infiltration of liquids into the waste and  
21        releases of CCR, leachate, or contaminated run-off to the  
22        ground or surface waters or to the atmosphere; [and]

23                Include measures that provide for major slope stability to  
24        prevent the sloughing or movement of the final cover system  
25        during the closure and post-closure care period.

1 40 C.F.R. § 257.102(d)(1)(i) and (iii). These standards, which must be met for  
2 all cap-in-place closures, make closure-by-removal a more cost-effective and  
3 feasible alternative for the Company's basins, as I demonstrate in my testimony.  
4 This is particularly so in light of the basins' placement in relationship to the  
5 uppermost aquifer (CCR Rule location criterion (1)), and also in light of  
6 wetlands criterion (2) at seven of the basins.

7 **Q. HOW DO THESE PERFORMANCE STANDARDS IMPACT THE**  
8 **CHOICE OF CLOSURE METHODOLOGY?**

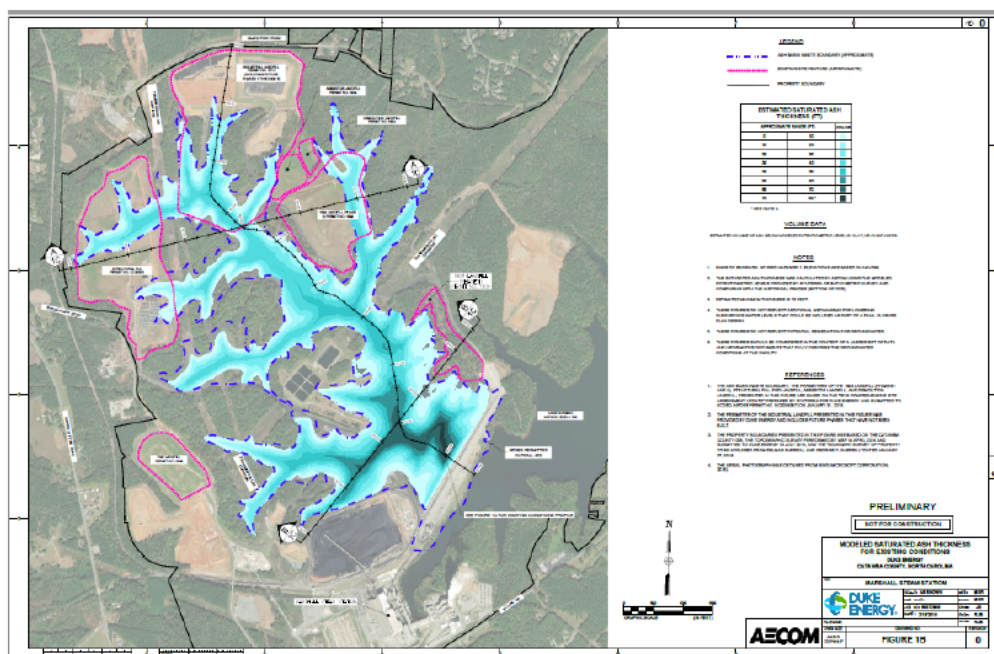
9 A. The performance standard that requires the CCR unit owner/operator to  
10 "[c]ontrol, minimize or eliminate, to the maximum extent feasible, post-closure  
11 infiltration of liquids into the waste and releases of CCR, leachate, or  
12 contaminated run-off to the ground or surface waters or to the atmosphere" has,  
13 as Witness Williams notes, been given a stringent interpretation by EPA – an  
14 interpretation that essentially precludes any current or potential future contact  
15 between capped-in-place CCR and groundwater. This has serious implications  
16 for coal ash basins where the base of the basin intersects with groundwater –  
17 *i.e.*, where ash in the basin is in contact with groundwater, or where there is a  
18 hydraulic connection between the basin and groundwater. Significant  
19 engineering controls would need to be employed to address the ash in contact  
20 with the groundwater – and the viability and cost of these controls is highly  
21 dependent on-site specific conditions.

1           In light of all of the attendant circumstances, the prudent and cost-  
2           effective closure option for these basins consistent with the requirements of the  
3           CCR Rule, and approved by state regulatory agencies, is closure-by-removal.

4   **Q.   PLEASE EXPLAIN FURTHER THE SITE-SPECIFIC CONDITIONS**  
5           **THAT INDICATE THAT COAL ASH IS IN CONTACT WITH**  
6           **GROUNDWATER AT THE COMPANY’S COAL ASH BASINS.**

7   A.   All of the Companies’ basins, no matter where located, were developed in  
8           accordance with industry and regulatory standards existing at the time of their  
9           construction. The basins developed at six of the seven DEC sites (W.S. Lee,  
10          Marshall, Cliffside, Belews Creek, Allen, and Buck) are what is known as  
11          “valley-filled” basins, in that they resulted from the installation of dams across  
12          existing stream valleys. Prior to dam construction, groundwater naturally  
13          charged these streams; post-construction, groundwater charged the resulting  
14          coal ash impoundment.

15          “Valley-filled” basins are man-made lakes and have irregular  
16          geometries, sometimes referred to as fingers. Their bases, which essentially are  
17          the bases of the (former) stream valleys, are also highly irregular. The figure  
18          below is the Marshall Ash Basin, which illustrates the typical features of a  
19          “valley-filled” basin:



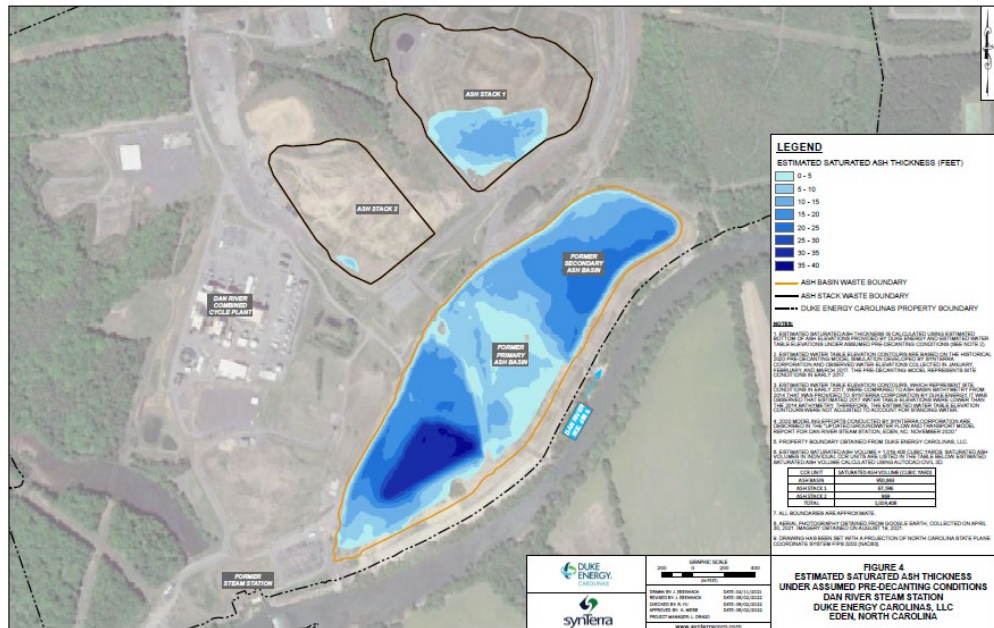
**Figure 1: Marshall Ash Basins, Saturated Ash Thickness as of 2018**  
(saturated ash thickness shown in blue in 10 ft increments; max depth approx. 80 ft.)

This figure illustrates the depth of saturated ash in the basin based upon surveys conducted in 2018; the darker color represents ash at greater depths, corresponding to thicker portions of the basin that has ash in contact with groundwater.

The Dan River basins were constructed by what is known as the “ring-dike” method, by which the pond area is excavated down from grade level, using spoils or off-site materials to create a perimeter (*i.e.*, “ring”) dike.<sup>10</sup> These were constructed in a low-lying area with high water tables, and in close proximity to the Dan River. Like the valley-filled basins discussed above, these

<sup>10</sup> Although DEC is not in this case seeking cost recovery in connection with the closure of the ash basins at Riverbend, those impoundments were also constructed by the “ring-dike” method, also within low-lying wetlands areas adjacent to rivers. Each of these basins also contains ash in contact with groundwater.

1 basins failed the CCR Rule location restriction Criterion (1), placement above  
 2 the uppermost aquifer. The figure below is of the Dan River site, which  
 3 illustrates a “ring-dike” basin:



4 **Figure 2: Dan River Ash Basins, Saturated Ash Thickness as of 2018**  
 5 **(saturated ash thickness shown in blue in 5 ft increments; max depth**  
 6 **approx. 35-40 ft.)**

7 As with Figure 1, this figure illustrates the depth of saturated ash in the  
 8 basin based upon surveys conducted in 2018; the darker color represents a  
 9 thicker layer of saturated ash, corresponding to deeper portions of the basin  
 10 where ash is in contact with groundwater.

1   **Q.   HAS EPA PROVIDED CLARIFICATION TO ITS INTERPRETATION**  
2       **OF HOW ASH IN CONTACT WITH GROUNDWATER MUST BE**  
3       **ADDRESSED?**

4   A.   Yes. In January 2022 EPA clarified that the ash-in-contact-with-groundwater  
5       condition, if it exists at a CCR site, must be addressed with stringent (and often  
6       very costly) engineering controls to ensure that, if not excavated, the ash left in  
7       place and groundwater are separated and, in the words of the CCR Rule itself,  
8       the closure is executed so as to “[c]ontrol, minimize or eliminate, to the  
9       maximum extent feasible, post-closure infiltration of liquids into the waste and  
10      releases of CCR, leachate, or contaminated run-off to the ground or surface  
11      waters or to the atmosphere.” This clarity comes through loud and clear in U.S.  
12      EPA’s November 18, 2022, *Denial of Alternative Closure Deadline for General*  
13      *James M. Gavin Plant, Cheshire, Ohio* Docket No. EPA-HQ-OLEM-2021-  
14      0590 (hereinafter “*Gavin Denial*”). The Gavin site closed one of its on-site  
15      basins by leaving CCR in place but failed to meet the closure performance  
16      standards:

17           EPA concludes that at least a portion of the CCR in the closed  
18           FAR remains in contact with groundwater. Based on these  
19           findings and the absence of any information in the record to  
20           document that measures were taken to address the groundwater  
21           migrating into and out of the impoundment from the bottom  
22           and the sides, EPA concludes that Gavin has failed to  
23           demonstrate compliance with the performance standards for  
24           closure with waste in place in 40 CFR 257.102(d).

25      *Gavin Denial* at 14.

26      EPA further explained:



1 Whether any particular unit can meet these performance  
2 standards is a fact and *site-specific determination* that will  
3 depend on a number of considerations, such as the  
4 hydrogeology of the site, the engineering of the unit, and the  
5 kinds of engineering measures implemented at the unit.  
6 Accordingly, the fact that prior to closure the base of a unit  
7 intersects with groundwater does not mean that the unit may  
8 not ultimately be able to meet the performance standards in 40  
9 CFR 257.102(d) for closure with waste in place. Depending on  
10 the site conditions a facility may be able to meet these  
11 performance standards by demonstrating that a combination of  
12 engineering measures and site-specific circumstances will  
13 ensure that, after closure of the unit has been completed, the  
14 groundwater is no longer in contact with the waste in the closed  
15 unit.

16 *Gavin Denial* at 28 (emphasis added).

17 The *Gavin Denial* confirms EPA's interpretation of the CCR Rule to  
18 require engineering controls so as to deal with ash in contact with groundwater  
19 in the event the basin owner/operator elects an in-place solution to basin  
20 closure.<sup>11</sup>

21 In addition, EPA has recently issued a proposed rule addressing legacy  
22 CCR units, that is inactive surface impoundments at power plant facilities that  
23 ceased operation prior to the 2015 effective date of the CCR Rule. EPA  
24 provided extensive additional comment on the importance of preventing contact  
25 of ash with groundwater in proposed rule.

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<sup>11</sup> I am aware of a legal challenge to EPA's interpretations lodged by the Utility Solid Waste Activities Group ("USWAG") as well as a number of other parties. However, DEC may not prudently ignore EPA's own interpretation of its rules. I am further aware that Duke Energy Indiana ("DEI"), an affiliate of the Company, is a member of USWAG. While DEI has an interest in USWAG's challenge to EPA, that interest has nothing whatsoever to do with EPA's position with respect to the need for engineering controls in connection with basin closure-in-place where ash is in contact with groundwater. To the contrary, the environmental authorities in Indiana are aligned with DHEC, DEQ, and EPA in rejecting proposed closure methodologies that would leave ash in contact with groundwater for basins covered by the Federal CCR rule.

1 The record shows that significant numbers of CCR surface  
2 impoundments were constructed such that the base of the unit  
3 intersects with groundwater, and that many “closed”  
4 impoundments, even those closed in accordance with state  
5 permits, continue to impound water below the water table (i.e.,  
6 contain liquid). The risks associated with such closures can be  
7 substantial (see Unit IV.B.1.b of this preamble for more  
8 information).

9 88 Federal Register 31991 (May 18, 2023). EPA is expected to issue its final  
10 rule later this year.

11 **Q. HAVE SOUTH CAROLINA ENVIRONMENTAL REGULATORS**  
12 **EXPRESSED CONCERN WITH LEAVING COAL ASH IN CONTACT**  
13 **WITH GROUNDWATER IN THE EVENT OF CLOSURE-IN-PLACE?**

14 A. Yes. I alluded to this earlier in my testimony but provide more detail here.

15 Closure of DEC’s W.S. Lee and DEP’s Robinson basins proceeded on a  
16 roughly contemporaneous basis, including roughly contemporaneous  
17 interactions between Duke Energy and DHEC. Thus, in September 2014, Duke  
18 Energy notified DHEC of the Company’s intent to close the W.S. Lee Inactive  
19 Ash Basin (“IAB”) and Ash Fill Area (“AFA”), two of the four CCR units  
20 located on the site, by excavation. This was memorialized in a Consent Order  
21 (14-13-HW) that required the Company to fully excavate the ash from the IAB  
22 and the AFA, either to a permitted landfill or for beneficial reuse. In addition to  
23 these two CCR units, Duke Energy was working with DHEC on closure plans  
24 for W.S. Lee’s Primary Ash Basin (“PAB”) and Secondary Ash Basin (“SAB”),  
25 again contemporaneous with closure of the Robinson ash basin.

1           With regard to the Robinson ash basin, as indicated in my direct  
2 testimony in the DEP-SC 2022 Rate Case, on February 24, 2015 (even before  
3 the effective date of the CCR Rule), DHEC provided DEP with comments  
4 concerning closure of the basin. DHEC's comments note that the ash basin "was  
5 constructed in a natural drainage area" (*i.e.*, that the basin is a "valley-filled"  
6 basin), and that ash was located "at a minimum of 18 feet below the water table  
7 in the basin." DHEC concluded that under these circumstances, "to prevent  
8 future on-going groundwater contamination at the site, ***any closure strategy will***  
9 ***need to assure that groundwater will not be in contact with ash.***" (Emphasis  
10 added.)

11           Accordingly, the Company submitted in December 2015 a conceptual  
12 closure plan to excavate the PAB and SAB at W.S. Lee to an on-site landfill.  
13 The closure plan was approved by DHEC in March of 2016.

14           I note also that in DEC's previous rate case (Docket No. 2018-319-E),  
15 ORS Witness Dan Wittliff testified that the Company's activities at W.S. Lee  
16 were "Federal CCR [Rule] Compliant" (*see* Docket No. 2018-319-E, Tr. Vol. 6  
17 page 1340-32), and he supported recovery of the corresponding costs. *Id.*, page  
18 1340-39. In light of EPA's interpretation of the CCR Rule to essentially preclude  
19 any current or potential future contact between capped-in-place CCR and  
20 groundwater, Witness Wittliff's testimony that closure-by-excavation at W.S.  
21 Lee is CCR Rule-compliant is entirely consistent with the requirements of the  
22 Rule.

1           The decision, and DHEC's approval thereof, to close W.S. Lee by  
2           excavation actually came late in the day for South Carolina. By 2015 the other  
3           South Carolina electric utilities –SCE&G and Santee Cooper – had already  
4           committed to excavate their ash basins. SCE&G first did so with respect to its  
5           ponds at the company's Wateree Station in Richland County in a settlement  
6           agreement it entered into on August 17, 2012, to resolve a citizen's suit brought  
7           under the South Carolina Pollution Control Act by the Catawba Riverkeeper  
8           Foundation, Inc. Santee Cooper first did so with respect to its ponds at the  
9           Grainger Generating Station in Conway, South Carolina in a 2013 settlement  
10          agreement to resolve multiple citizens suits brought under South Carolina law  
11          and the federal Clean Water Act by the Winyah Rivers Foundation, Inc., the  
12          South Carolina Coastal Conservation League, and Southern Alliance for Clean  
13          Energy. These closure-by-removals all needed DHEC permits and approval,  
14          which both SCE&G and Santee Cooper ultimately obtained. In fact, *all* South  
15          Carolina ash basins covered by the CCR Rule are being closed by excavation.

16   **Q.    LIKEWISE, HAVE NORTH CAROLINA ENVIRONMENTAL**  
17   **REGULATORS EXPRESSED CONCERN WITH LEAVING COAL**  
18   **ASH IN CONTACT WITH GROUNDWATER IN THE EVENT OF**  
19   **CLOSURE-IN-PLACE?**

20   **A.**    Yes. The Company submitted to DEQ closure plans for its Allen, Marshall,  
21          Belews Creek, and Cliffside basins in November 2018, and proposed cap-in-  
22          place closure for the basins at those sites. DEQ disagreed, and on April 1, 2019,  
23          directed the Company to excavate all the ash in the aforementioned sites. DEQ

1 determined that closure-by-removal would be more protective of the  
2 environment and would minimize the risk of future groundwater contamination.  
3 Specifically, DEQ expressed concern that capping the ash basins in place would  
4 leave CCR in contact with groundwater and present future environmental  
5 concerns – *precisely the same concern that DHEC had with respect to the*  
6 *W.S. Lee and Robinson ash basins, and precisely the same concern that*  
7 *animated EPA’s interpretation of the CCR Rule’s performance standards.*

8 Ultimately, the closure-method issue for Allen, Marshall, Belews Creek,  
9 Cliffside and Buck was resolved by the Company and DEQ through agreement,  
10 just like SCE&G and Santee Cooper’s South Carolina basins were closed by  
11 agreement. On December 31, 2019, the Company, DEQ, and environmental and  
12 community groups (“Community Groups”)<sup>12</sup> entered into a comprehensive  
13 settlement (the “CCR Settlement”). The CCR Settlement was then judicially  
14 accepted by the North Carolina Superior Court for Wake County on February  
15 5, 2020, when the Court entered an order (“2020 Consent Order”) adopting and  
16 ordering the implementation of the CCR Settlement. Pursuant to the CCR  
17 Settlement, as adopted and implemented by the Consent Order, the Company is  
18 required to excavate all the ash in the basins at Allen, Marshall, Belews Creek,  
19 and Cliffside *except* the ash under or within the on-site landfills at Marshall and

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<sup>12</sup> The Community Groups which entered into the settlement are: Appalachian Voices, Stokes County Branch of the NAACP, Mountain True, The Catawba Riverkeeper Foundation, Waterkeeper Alliance, Sierra Club, Roanoke River Basin Association, Cape Fear River Watch, Inc., Neuse River Foundation/Sound Rivers, Inc., and NC State Conference of the NAACP.

1       Belews Creek. For Buck, the 2020 Consent Order required the Company to  
2       excavate the ash and either place it in a landfill or beneficially reuse it.

3               By entering into the CCR Settlement the Company was able to end all  
4       litigation in connection with these ash basins, with the attendant benefit of  
5       eliminating the inherent cost and uncertainty of litigation. In addition, the CCR  
6       Settlement avoided the costs associated with removal of portions of the ash at  
7       the Marshall PV Structural Fill and the closed 1804 Phase II landfill, and closed  
8       Pine Haul Road landfill at Belews Creek – a savings to customers of an  
9       estimated \$460 million on a system basis (approximately \$106 million on a  
10      South Carolina retail customer basis). Further, by entering into the CCR  
11      Settlement, the Community Groups agreed not to oppose extensions to the dates  
12      in CAMA to beneficiate all the ash in the Buck basins, opening the possibility  
13      for the Company to beneficiate all the ash at Buck, and avoid costs associated  
14      with off-site landfilling of the ash in order to meet initial CAMA deadline of  
15      2029, a savings to customers of an estimated \$140M on a system basis. On  
16      October 10, 2023, the North Carolina General Assembly approved Senate Bill  
17      678, with included revisions to CAMA that aligned the required closure dates  
18      for the referenced basins to those in the CCR Settlement, removing any  
19      potential barriers to fully beneficiating all the ash at Buck.

1   **Q.    WHAT CONCLUSIONS DO YOU DRAW FROM THE REGULATORY**  
2       **ACTIONS TAKEN BY EPA, DHEC, AND DEQ WITH RESPECT TO**  
3       **COAL ASH BASINS?**

4    A.    These environmental regulatory and enforcement agencies are all completely  
5       aligned on the issue of coal ash in contact with groundwater. This is shown by:

- 6           •   EPA's interpretation of the CCR Rule's technical and performance  
7               standards, both in its January 2022 and November 2022 Gavin  
8               determinations and as reflected in its legacy CCR surface impoundment  
9               proposed rule;
- 10          •   DHEC's approval of closure by excavation at W.S. Lee; and
- 11          •   DEQ's approval of closure by excavation at Allen, Marshall, Belews  
12               Creek, Cliffside and Buck.

13       With the agencies all aligned, site-specific conditions, including ash in contact  
14       with groundwater make closure-by-removal the appropriate closure  
15       methodology for the Company's basins. The Company is implementing that  
16       method at every basin for which cost recovery is sought in this case.

17   **Q.    TURNING NOW TO THE ACTUAL CLOSURE COSTS INCURRED BY**  
18       **THE COMPANY AND SOUGHT TO BE RECOVERED IN THIS CASE,**  
19       **WERE YOU ABLE TO REACH A CONCLUSION ABOUT WHETHER**  
20       **THE COSTS AND ACTIVITIES THAT YOU DESCRIBE IN YOUR**  
21       **TESTIMONY WERE REASONABLE AND PRUDENT?**

22    A.    Yes. Based upon my training, experience, understanding of the Company's  
23       regulatory obligations, and review of the Company's records, I conclude that

1 the actual and forecasted activities and costs to close the DEC CCR storage  
2 areas were reasonable and prudent.

3 **Q. WHAT FACTORS DID YOU CONSIDER WHEN MAKING YOUR**  
4 **REASONABLENESS AND PRUDENCY DETERMINATION?**

5 A. I evaluated the reasonableness and prudence of the Company's closure  
6 activities and associated costs based upon the following criteria: 1) whether the  
7 activities performed and to be performed are necessary; 2) whether the costs for  
8 the necessary activities are appropriate; and 3) whether the closure projects are  
9 meeting Company and regulatory deadlines.

10 **Q. ARE THE CLOSURE ACTIVITIES THAT ARE DESCRIBED IN YOUR**  
11 **TESTIMONY NECESSARY?**

12 A. Yes. As part of my role within CCP, I am well-versed in the federal and state  
13 regulatory obligations relating to DEC's CCR management areas. These  
14 regulations dictate how and by when closure must be achieved and dictate other  
15 specific environmental requirements. For any major undertaking, like the  
16 closure projects described above, Duke Energy relies on both Company and  
17 third-party technical experts to provide consulting, engineering, and  
18 construction services. For each site, the closure activities are based on  
19 strategies, plans, scientific expertise, and schedules developed through  
20 coordination between technical experts both within and outside the Company  
21 to satisfy regulatory obligations. Each closure activity for which the Company  
22 is requesting cost recovery aligns with the Company's obligations under the  
23 CCR Rule and can be traced to specific provisions of the CCR Rule, state



1 regulatory requirements, or direction from state regulatory agencies. Therefore,  
2 I have concluded that the closure activities described in my testimony for each  
3 DEC site were necessary to comply with the Company's regulatory obligations.

4 **Q. HAS THE COMPANY TAKEN SUFFICIENT MEASURES TO ENSURE**  
5 **THAT COSTS FOR ITS CLOSURE PROJECTS ARE**  
6 **APPROPRIATELY MANAGED AND MINIMIZED?**

7 A. Yes. DEC has a robust system in place to review the costs of its CCR Unit  
8 closure projects from inception to payment. Specifically, DEC has implemented  
9 and followed strict contracting policies and procedures to receive and evaluate  
10 bids for its closure activities. Purchases were procured under the purview of the  
11 Duke Energy Purchasing Controls Policy, which lays out requirements for  
12 competitive bidding, vendor selection and purchase order use. All expenditures  
13 against purchase orders are reviewed and approved under the requirements  
14 documented in the Delegation of Authority Policy.

15 DEC also maintains detailed budgets, which are updated quarterly to  
16 incorporate the knowledge and experience the Company has gained during the  
17 project. Scope changes or estimate deviations are documented and approved if  
18 appropriate.

19 These processes are utilized to ensure the costs that the Company has  
20 incurred and will incur for tasks associated with the CCR Rule, CAMA, and  
21 other state regulatory requirements are reasonable, necessary, and are consistent  
22 with the costs of similar services on the open market. The costs incurred for all

1 closure activities were, and continue to be, reviewed through rigorous  
2 purchasing and expenditure review processes.

3 **Q. ARE THE COMPANY'S CLOSURE ACTIVITIES PROCEEDING ON**  
4 **SCHEDULE?**

5 A. Yes. Complex projects require coordination between Company personnel, with  
6 permitting authorities, and contractors. To that end, DEC has developed  
7 extensive and detailed plans and schedules related to each aspect of the overall  
8 site closure.

9 I visit each site, meet with site managers, and regularly discuss the status  
10 and progress of the closure projects. I also reviewed site closure plans and  
11 schedules. I have reviewed status reports covering September 1, 2018, to the  
12 present and have attended monthly project status review meetings.

13 The closure plans and schedules the Company has developed for each  
14 site details the tasks and strategy being executed to meet its regulatory deadlines  
15 and performance standards. Where applicable, plans were submitted to and  
16 approved by regulatory agencies and made available to the public, and the  
17 Company developed schedules to meet the approved commitments. Schedules  
18 are reviewed, at a minimum, monthly with senior management to ensure  
19 adherence to regulatory requirements and deadlines. Inevitably, all complex  
20 projects face complicating factors, which may require modification of plans and  
21 schedules. DEC's managerial oversight of these projects ensures that the  
22 Company will still be able meet its regulatory obligations despite these  
23 complications. DEC's management also maintains a direct line of

1 communication with regulators in the event plans or schedules may need to be  
2 modified. DEC's closure projects are all on target to meet applicable regulatory  
3 requirements. Therefore, I have concluded that the Company has been properly  
4 managing its closure projects to ensure compliance with project schedules,  
5 performance standards, and regulatory deadlines.

6 **III. SITE-BY-SITE HISTORY, CONDITIONS, CLOSURE ACTIVITY, AND**  
7 **ASSOCIATED COSTS SOUGHT FOR RECOVERY**

8 **Q. PLEASE PROVIDE A SUMMARY OVERVIEW OF THIS SECTION OF**  
9 **YOUR TESTIMONY.**

10 A. In the previous Sections, I demonstrated that (1) the CCR Rule requires each of  
11 the Company's ash basins for which cost recovery is sought to close; (2) all  
12 basins contain ash in contact with groundwater; (3) in addition to ash in contact  
13 with groundwater concerns, interactions with wetlands must also be addressed  
14 during basin closure at seven Company-owned/operated ash basins, including  
15 Buck; (4) the EPA, DHEC, and DEQ are all aligned in their concern that ash in  
16 contact with groundwater is not an acceptable post-closure condition; (5)  
17 excluding Buck, all sites are able to support disposal of excavated ash to an on-  
18 site landfill; (6) were the Company to pursue a close-in-place strategy with  
19 respect to any of its ash basins at which an on-site landfill is a feasible option,  
20 in light of these site-specific conditions, the CCR Rule would require extensive  
21 engineering controls to ensure that the Rule's close-in-place performance  
22 standards would be met both during closure and throughout a decades-long  
23 post-closure care period; (7) as a result, the prudent closure methodology for

1 each basin, consistent with the requirements of the CCR Rule, is closure-by-  
2 removal; and (8) closure-by-removal is the method being utilized by the  
3 Company and approved by regulators in each instance.

4 In this Section, I apply these principles to each of the Company's plant  
5 sites, highlighting their history and the site-specific conditions that make  
6 closure-by-removal the prudent option for closure of the site's basins. I also  
7 recap the closure activities the Company has undertaken at each site, and the  
8 costs associated with those activities that are being sought in this case.

9 In addition, my testimony in this section addresses beneficial reuse of  
10 ash removed from certain of the Company's ash basins. As Witness Williams  
11 testifies, EPA has defined beneficial reuse in the CCR Rule to include use as a  
12 raw material in cement manufacturing, in manufacturing wallboard, or as  
13 structural fill meeting certain EPA-issued requirements. Witness Williams  
14 indicates that EPA has long been a proponent of beneficial coal ash reuse  
15 because the practice can reduce the use of virgin resources, lower greenhouse  
16 gas emissions, reduce the cost of coal ash disposal, and add improved strength  
17 and durability to product materials.

18 Further, as previously addressed in my testimony, the State of South  
19 Carolina has also endorsed beneficial reuse of ash and has been a leader in this  
20 respect. In fact, the technology that allows conversion of coal ash for beneficial  
21 reuse was developed by a South Carolina company, the SEFA Group, and first  
22 implemented at Santee Cooper's Winyah Station. Press reports indicate (1) that  
23 Santee Cooper (which is owned by the State) announced in November 2013 that

1 it planned to beneficially reuse all the ash in the basins at its Jeffries, Winyah,  
2 and Grainger Stations, and (2) that all the ash in the basins at SCE&G's Canadys  
3 Station is also being beneficially reused. In addition, beneficial reuse was  
4 successfully employed as a closure strategy at the Dominion-SC Wateree  
5 Station, for which Dominion-SC received cost recovery.

6 In North Carolina, CAMA requires Duke Energy to select three sites  
7 between DEP and DEC to install beneficial reuse technology to process ash  
8 from their basins. One of the sites selected, Buck, is owned and operated by  
9 DEC. I address beneficial reuse further in my site analysis of Buck.

10 Site analysis of each of the Company's sites for which cost recovery is  
11 sought in this case follows.

12 **A. W.S. LEE**

13 **Q. PLEASE PROVIDE A SITE HISTORY OF W.S. LEE.**

14 The W.S. Lee Steam Station, located in Belton, South Carolina, began  
15 generating coal-fired electricity in 1951. The Company operated three coal-  
16 fired generation units at W.S. Lee, all of which were retired by 2014. DEC now  
17 operates a natural gas combined-cycle plant at the site. An aerial view depicting  
18 the CCR storage areas ("CCR Units") at W.S. Lee is provided in Figure 3 below.

19 Ash was originally sluiced to the IAB, which was retired in 1974 when  
20 the PAB began operation. The SAB was placed in service in 1978. Ash was also  
21 occasionally dredged and disposed in a fill area known as the Ash Fill Area  
22 ("AFA"). While the IAB and AFA are not currently subject to the CCR Rule,  
23 they were excavated in accordance with the SC Consent Order / Settlement

1 Agreement. The IAB and AFA were closed by removal in 2017, and therefore  
 2 the disposal of CCR from those facilities are not subject of this case. However,  
 3 cost associated with groundwater monitoring and post-closure maintenance of  
 4 these two areas is included.



5 **Figure 3: Aerial showing CCR Units at W.S. Lee (red line indicates limits**  
 6 **of ash basin. Orange line indicates limits of the Inactive Ash Basin, Ash Fill**  
 7 **Area, and Structural Fill)**

8 **Q. DOES THE CCR RULE REQUIRE CLOSURE OF THE W.S. LEE ASH**  
 9 **BASINS?**

10 A. Yes. The W.S. Lee PAB and SAB failed to meet the CCR Rule's aquifer  
 11 restriction Criterion (1) because the basin's ash is located within five feet of the  
 12 uppermost aquifer, and neither basin is lined. Additionally, the SAB fails  
 13 restriction Criterion (2) because it is partially located within a wetland.

1 **Q. WHAT CLOSURE METHODOLOGY IS THE COMPANY**  
2 **EMPLOYING WITH RESPECT TO THE W.S. LEE ASH BASINS?**

3 A. The chosen closure methodology for the W.S. Lee PAB and SAB is  
4 closure-by-removal. Ash from both the PAB and SAB will be placed in a  
5 permitted, on-site landfill.

6 **Q. WHY WAS THAT METHOD OF CLOSURE CHOSEN?**

7 As I have previously described in my testimony, the Company engaged with  
8 DHEC concerning ash removal at the W.S Lee site before promulgation of the  
9 CCR Rule. DHEC had at that point already dealt with basin closure issues with  
10 both Santee Cooper and SCE&G and had already approved closure-by-removal  
11 plans for those utilities.

12 DHEC continued this closure approach with DEC and reached an  
13 agreement with the Company in September of 2014 for the closure-by-removal  
14 of the IAB and AFA, and in March 2016 DHEC approved the Company's plan  
15 to close the PAB and SAB by removal to an on-site landfill.

16 **Q. WHAT CLOSURE ACTIVITIES HAS THE COMPANY**  
17 **UNDERTAKEN AT W.S. LEE FOR WHICH IT IS SEEKING COST**  
18 **RECOVERY?**

19 A. Since September 1, 2018, the Company has engaged in numerous activities in  
20 order to meet its obligation to close the CCR units at W.S. Lee, including:

- 21
  - Performing engineering design and site assessments to facilitate closure;

- 1 • Obtained environmental permits to construct the on-site landfill (located
  - 2 substantially within the footprint of the SAB) and installed groundwater
  - 3 monitoring wells;
  - 4 • Dewatering the ash basins;
  - 5 • Installing, monitoring, maintaining, and sampling groundwater monitoring
  - 6 wells to meet CCR Rule and state requirements, including preparing and
  - 7 submitting reports;
  - 8 • Designed and constructed sedimentation basins;
  - 9 • Constructed new landfill cells and installed liner systems, including a
  - 10 construction drain for the landfill sump area;
  - 11 • Installed leachate detection and pumping systems;
  - 12 • Constructing haul roads to transport excavated ash on-site;
  - 13 • Developing ash excavation and landfill operation / fill plans; and
  - 14 • Decommissioned the ash basin dam risers.
- 15 **Q. WHAT COSTS HAS THE COMPANY INCURRED FOR WHICH IT IS**
- 16 **SEEKING RECOVERY?**
- 17 A. The actual costs from September 2018 through September 2023 and the
- 18 estimated costs from October 2023 through December 2023, on a system basis,
- 19 are \$89 million. The amount allocated on a South Carolina retail basis is \$21
- 20 million.



1           **B.       MARSHALL**

2   **Q.       PLEASE PROVIDE A SITE HISTORY OF MARSHALL.**

3   A.       The Marshall Steam Station has been in operation since 1965. Marshall has one  
4           impoundment, referred to as the Ash Basin, which was put into service in 1965  
5           to receive sluiced CCR. It was created by constructing an earthen dike at the  
6           historic confluence of Holdsclaw Creek and the Catawba River. In 1984,  
7           Marshall's generation units were converted to produce dry fly ash as a  
8           byproduct of burning coal, after which the basin only received sluiced bottom  
9           ash. Subsequently, the Company constructed the Dry Ash Landfill ("1804  
10          Landfill") to receive the dry fly ash; Phase I operated from 1984 to 1986 and  
11          Phase II operated until 2001. An on-site structural fill area also received dry fly  
12          ash from approximately 1999 through 2013 ("PV Structural Fill"). In 2010, the  
13          Company constructed the on-site Industrial Landfill ("ILF"), which is permitted  
14          to receive fly ash, bottom ash, flue gas desulfurization ("FGD") residuals (i.e.,  
15          gypsum), and other CCR. FGD residuals have also been stored in the FGD  
16          Landfill, which was closed in 2019. An aerial image depicting the CCR units at  
17          Marshall is provided in Figure 4 below.



**Figure 4 - Aerial showing the CCR Units at Marshall (red line indicates limits of the ash basin. Green lines indicate limits of other CCR areas. Yellow lines indicate landfills – both historic and current)**

**Q. DOES THE CCR RULE REQUIRE CLOSURE OF THE MARSHALL ACTIVE ASH BASIN?**

**A.** Yes. The Marshall Ash Basin failed to meet CCR Rule location restriction Criterion (1) – placement above the uppermost aquifer – in that the basins is located within five feet of the uppermost aquifer, and Criterion (2) - location within a wetland. In addition, the basin is unlined. Accordingly, the CCR Rule requires closure of the Marshall Ash Basin.

1   **Q.   WHAT CLOSURE METHODOLOGY IS THE COMPANY**  
2   **EMPLOYING WITH RESPECT TO THE ACTIVE ASH BASIN?**

3   A.   The chosen closure methodology for the Marshall Ash Basins is closure-by-  
4   removal to an on-site landfill.

5   **Q.   WHY WAS THAT METHOD OF CLOSURE CHOSEN?**

6   A.   As already discussed in my testimony, and very similar to the position taken by  
7   DHEC with respect to the W.S. Lee ash basins, DEQ expressed reservation  
8   concerning closure-in-place under the site-specific conditions at Marshall, in  
9   particular because the impounded ash was in contact with groundwater, as  
10   shown previously in Figure 1. EPA, as I have shown and as detailed in the  
11   testimony of Witness Williams, shares this concern. Further, and again very  
12   similar to the situation in South Carolina, various environmental organizations  
13   also shared this concern, and these organizations (the Community Groups (*see*  
14   footnote 12, above)) had filed citizen suits under the provisions of RCRA and/or  
15   the Clean Water Act against the Company. And yet again, very similar to the  
16   situation in South Carolina, all pending and threatened suits by the Community  
17   Groups were resolved by the CCR Settlement.

18           The “valley-filled” Marshall basin contains ash in direct physical  
19   contact with groundwater. Had DEC closed the basin through cap-in-place, the  
20   CCR Rule would have required the Company to construct engineering controls  
21   so as to “control, minimize, or eliminate” ash in contact with groundwater, and  
22   even then, there would remain uncertainty as to whether the performance could  
23   be met throughout the post-closure period. The Burns & McDonnell evaluation,

1 presented with the testimony of Witness Rokoff, indicates that in general a  
2 closure-in-place strategy would require the installation of targeted in-situ  
3 stabilization (“ISS”) throughout the Ash Basin as the underlying geology would  
4 not allow for a hydraulic separation between the groundwater and the base of  
5 the basin. As shown in Table 2, the estimated cost of this work is more than  
6 twice the Company’s most recent cost estimate for closure-by-removal of the  
7 Marshall Ash Basin – \$1.2 billion for close-in-place versus \$534 million for  
8 excavation.

9 The Burns & McDonnell evaluation thus shows that the closure  
10 methodology being implemented by the Company is the lowest-cost option. In  
11 addition, as detailed in the testimony of Witness Williams, closure-by-removal  
12 eliminates the potential that the Company might have to incur future costs for  
13 maintaining the integrity of the final cover system, including any required  
14 maintenance. Moreover, closure-by-removal at the Marshall site for those areas  
15 included in the Consent Order minimizes the potential for future releases from  
16 the closed basin.

17 Based upon these factors, it is my opinion that closure-by-removal is the  
18 more prudent and cost-effective course of action with respect to the CCR units  
19 at Marshall.

1   **Q.   WHAT CLOSURE ACTIVITIES HAS THE COMPANY**  
2       **UNDERTAKEN AT MARSHALL FOR WHICH IT IS SEEKING COST**  
3       **RECOVERY?**

4   A.   Since September 1, 2018, the Company has engaged in numerous activities in  
5       order to meet its obligation to close the CCR units at Marshall, including:

- 6       • Completed removal of the 1804 Phase 1 Landfill, as required under the  
7       Consent Order.;
- 8       • Completed a stormwater diversion project to reduce stormwater flows to the  
9       Ash Basin;
- 10      • Completed construction of the groundwater Corrective Action Plan system  
11      phase 1 and commenced construction of the full-scale system;
- 12      • Developed and maintained on-site borrow areas;
- 13      • Installed a water treatment system and continued maintaining and operating  
14      the ash basin dewatering system;
- 15      • Completed construction of the leachate storage basin;
- 16      • Completed construction of cell 5 and cell 6 of the landfill;
- 17      • Capping the PV Structural Fill, and capping the 1804 Phase II Landfill, as  
18      required under the Consent Order, and designing and permitting of the  
19      stability features for these units; and
- 20      • Collecting and analyzing groundwater samples and preparing  
21      environmental and engineering reports for State and Federal regulators.

1   **Q.     WHAT COSTS HAS THE COMPANY INCURRED FOR WHICH IT IS**  
2   **SEEKING RECOVERY?**

3   A.     The actual costs from September 2018 through September 2023 and the  
4           estimated costs from October 2023 through December 2023, on a system basis,  
5           are \$204 million. The amount allocated on a South Carolina retail basis is \$48  
6           million.

7   **C.     CLIFFSIDE**

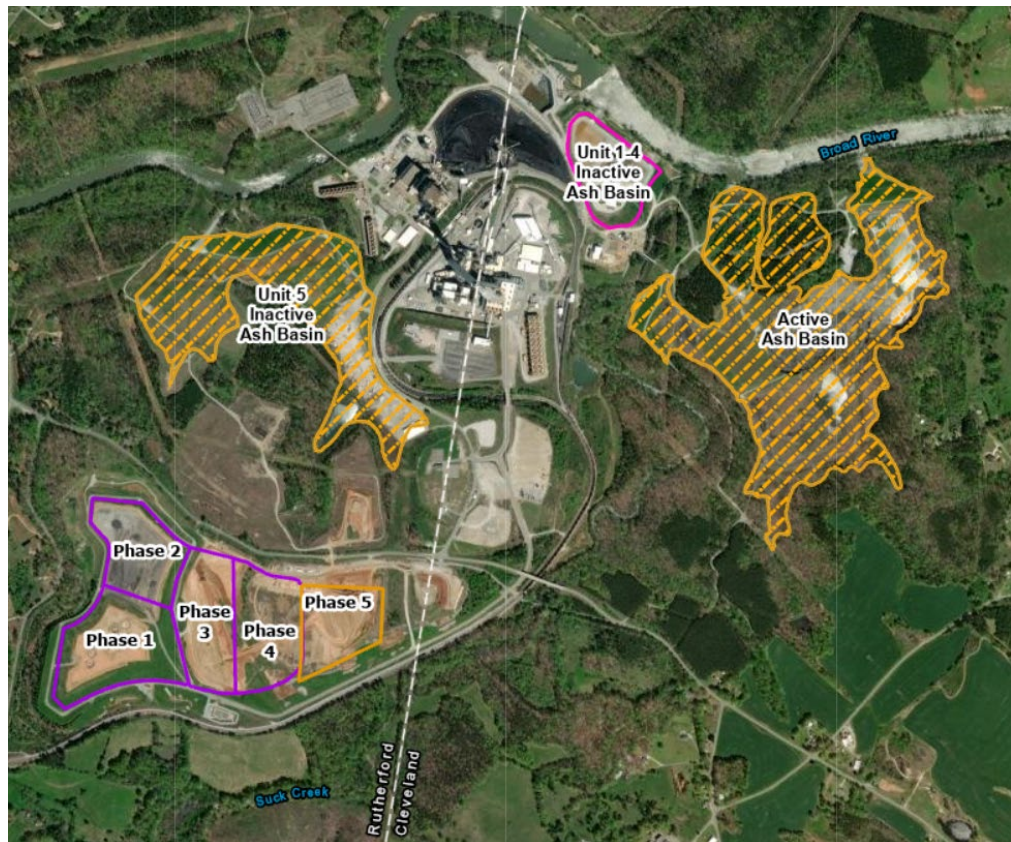
8   **Q.     PLEASE PROVIDE A SITE HISTORY OF CLIFFSIDE.**

9   A.     The Cliffside Steam Station is a coal-fired generation facility that has been in  
10          operation since 1940. The Company originally operated four coal-fired  
11          generation units at the station, with Unit 5 coming online in 1972, and Unit 6 –  
12          a clean-coal unit – in 2012. Units 1 through 4 were retired from service in 2011.  
13          Currently, only Units 5 and 6 are in operation.

14                 CCR from Cliffside have been stored in a combination of on-site ash  
15          basins and an on-site landfill. The oldest ash basin, referred to as the Units 1-4  
16          Inactive Ash Basin, was constructed in 1957 and was retired in 1977.  
17          Excavation of this basin was completed in 2017, and it was repurposed as a  
18          stormwater basin. The plant's second ash basin, the Unit 5 Inactive Ash Basin  
19          ("IAB"), was constructed in 1970, started to receive ash in 1972 and was closed  
20          in 1980. The plant's third ash basin, the Active Ash Basin ("AAB"), was  
21          constructed in 1975, expanded in 1980, and ceased operation in August 2018.  
22          An additional dry ash storage area ("ASA"), located within the northwestern  
23          portion of the AAB waste boundary, provided additional capacity. The lined



1 on-site landfill, which began receiving CCR in October 2010, is permitted to  
 2 receive fly ash, bottom ash, and other CCR. An aerial image depicting the CCR  
 3 storage areas at Cliffside is below.



4 **Figure 5 – Aerial showing CCR Units at Cliffside (orange line indicates limits of**  
 5 **Active Ash Basin and Unit 5 Inactive Ash Basin. Pink line indicates limits of**  
 6 **Unit 1-4 Inactive Ash Basin (excavated). Purple line indicates limits of landfill)**

7 **Q. DOES THE CCR RULE REQUIRE CLOSURE OF THE CLIFFSIDE**  
 8 **ASH BASINS?**

9 A. Yes. Both the Unit 5 IAB and the AAB failed to meet CCR Rule location  
 10 restriction Criterion (1) – placement above the uppermost aquifer – in that the  
 11 basin is located within five feet of the uppermost aquifer, as well as Criterion

1 (2) - wetlands. In addition, both basins are unlined. Accordingly, the CCR Rule  
2 requires closure of both the IAB and AAB.

3 **Q. WHAT CLOSURE METHODOLOGY IS THE COMPANY**  
4 **EMPLOYING WITH RESPECT TO THE CLIFFSIDE ASH BASIN?**

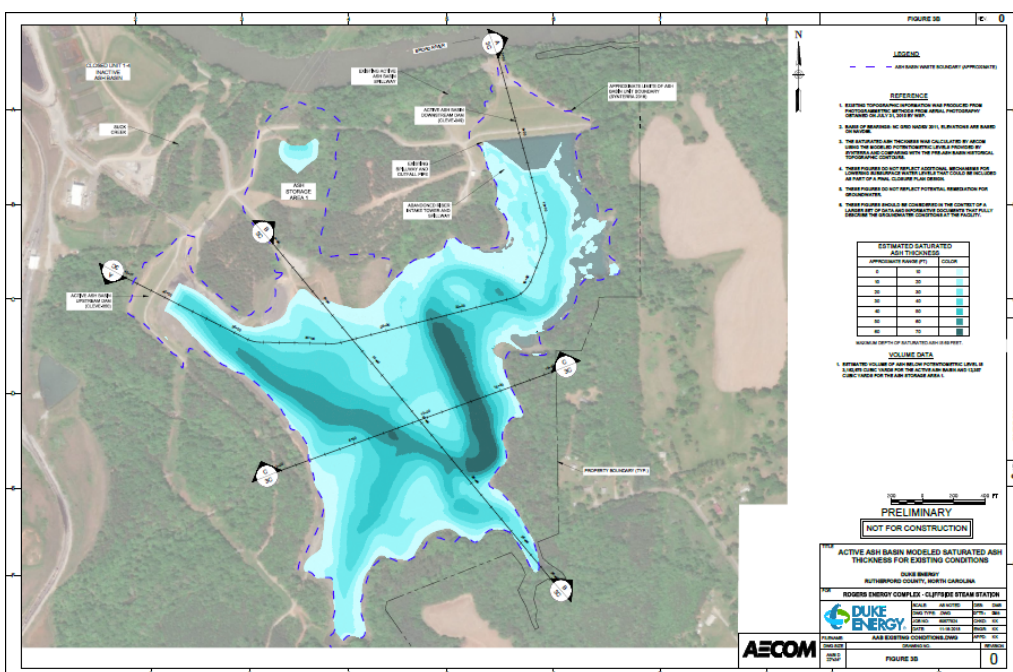
5 A. The chosen closure methodology for the Cliffside ash basins is closure-by-  
6 removal to an on-site landfill.

7 **Q. WHY WAS THAT METHOD OF CLOSURE CHOSEN?**

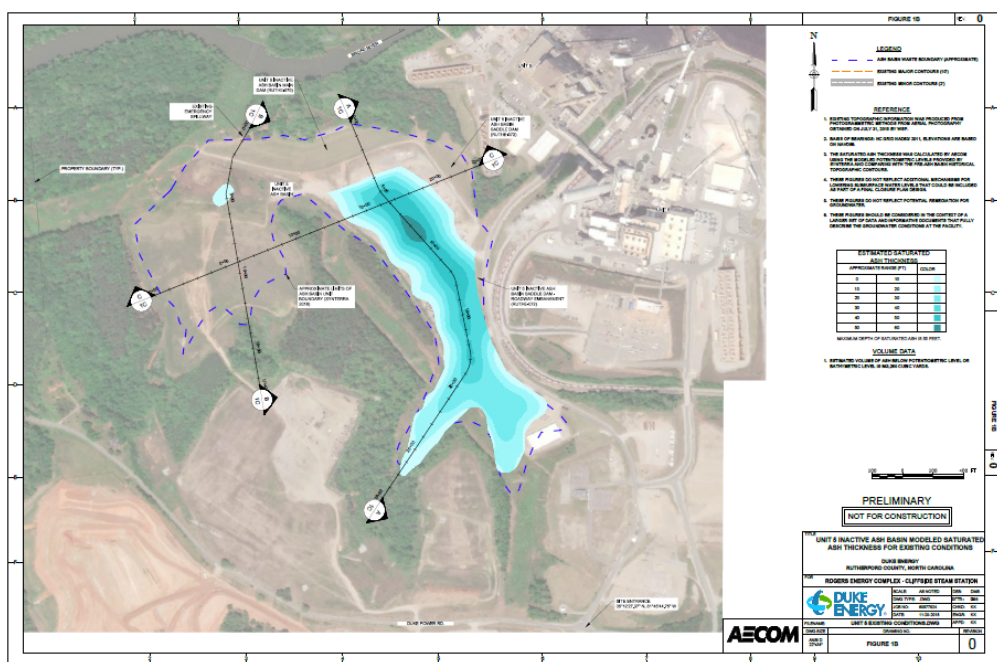
8 A. The site-specific considerations driving selection of closure-by-removal at  
9 Cliffside are similar to those at the other DEC locations – specifically, the  
10 presence of ash in contact with groundwater in the basins. The decision to close  
11 the basin by excavation, which was memorialized in the CCR Settlement the  
12 Company entered into with DEQ and the Community Groups.

13 As shown in Figure 1 above and Figures 6 and 7 below, the basins have  
14 the irregular fingers and irregular base characteristics of a “valley-filled”  
15 impoundment.





1 **Figure 6 – Active Ash Basin at Cliffside, Saturated Ash Thickness as of 2018**  
2 **(saturated ash thickness shown in blue in 10 ft. increments; max depth**  
3 **approx. 70 ft.)**



1 **Figure 7 – Unit 5 IAB at Cliffside, Saturated Ash Thickness as of 2018**  
2 **(saturated ash thickness shown in blue in 10 ft. increments; max depth**  
3 **approx. 60 ft.)**

4 As with Marshall, in order to meet the requirements of the CCR Rule, closure-  
5 by-removal is the most prudent and cost-effective method to achieve closure  
6 of the “valley-filled” Cliffside ash basins, which contain ash in contact with  
7 groundwater, given the specific geology of the site. Closure-in-place under the  
8 CCR Rule would require extensive engineering controls to meet the  
9 performance standard requiring closure to “control, minimize, or eliminate”  
10 ash in contact with groundwater. The Burns & McDonnell analysis indicated  
11 that a closure-in-place strategy would require the installation of targeted ISS  
12 throughout the basin, as the underlying geology would not allow for a  
13 hydraulic separation between the groundwater and the base of the basin. Burns  
14 & McDonnell’s estimate for a cap-in-place solution for basin closure, as shown  
15 in Table 2, is much greater than the Company’s most recent estimate for basin  
16 closure: \$485 million versus \$271 million. It should be noted that the Burns &  
17 McDonnell estimate does not include any costs associated with the closure of  
18 the Units 1-4 Inactive Ash Basin, which was excavated with the land reused  
19 for construction of a water treatment system, while the Company’s estimate  
20 includes the costs incurred to excavate this basin. Accordingly, the Burns &  
21 McDonnell estimate to close-in-place AAB and the Unit 5 IAB exceeds the  
22 Company’s estimated costs to excavate the AAB, the Unit 5 IAB, and the Units  
23 1-4 IAB combined.

1 In addition, all of the other factors supporting closure-by-removal set  
2 out in my testimony, as well as the testimony of Witness Williams, apply  
3 equally. Elimination of the uncertainties associated with closure-in-place,  
4 including the unknown and potentially large costs, applies equally with respect  
5 to Cliffside.

6 Based upon all of these factors, it is my opinion that closure-by-removal  
7 is the more prudent and cost-effective course of action with respect to the CCR  
8 surface impoundments at Cliffside.

9 **Q. WHAT CLOSURE ACTIVITIES HAS THE COMPANY**  
10 **UNDERTAKEN AT CLIFFSIDE FOR WHICH IT IS SEEKING COST**  
11 **RECOVERY?**

12 Since September 1, 2018, the Company has engaged in numerous activities in  
13 order to meet its obligation to close the CCR units at Cliffside, including:

- 14 • Completed excavation of the ASA, including the relocation of an existing  
15 transmission tower;
- 16 • Completed construction of the groundwater Corrective Action Program  
17 phase 1 and awarded the contract for full scale system construction;
- 18 • Completed construction of a haul road and bridge over the railroad tracks  
19 to support hauling CCR from the AAB to the on-site landfill;
- 20 • Excavating and hauling CCR from the IAB and AAB to the on-site landfill.
- 21 • Operating the ash basin dewatering and treatment systems to maintain the  
22 ash basins in a dewatered state; and

- 1           • Collecting and analyzing groundwater samples and preparing  
2           environmental and engineering reports for State and Federal regulators.

3   **Q.   WHAT COSTS HAS THE COMPANY INCURRED FOR WHICH IT IS**  
4   **SEEKING RECOVERY?**

5   A.   The actual costs from September 2018 through September 2023 and the  
6       estimated costs from October 2023 through December 2023, on a system basis,  
7       are \$126 million. The amount allocated on a South Carolina retail basis is \$30  
8       million.

9       **D.   BELEWS CREEK**

10   **Q.   PLEASE PROVIDE A SITE HISTORY OF BELEWS CREEK.**

11   A.   The Belews Creek Steam Station coal-fired generation facility has been in  
12       service since 1974. Belews Creek has one impoundment, the Active Ash Basin  
13       (“AAB”), which became operational in 1974, has historically been used to store  
14       sluiced CCR.

15               In 1984, Belews Creek converted to dry handling of fly ash and began  
16       disposing the fly ash in the on-site Pine Hall Road Landfill, while continuing to  
17       sluice bottom ash to the AAB. The Pine Hall Road Landfill reached capacity in  
18       2003 and was closed. From 2003 to 2007, dry fly ash was disposed of the  
19       Structural Fill near the Pine Hall Road Landfill. In 2007, the Company  
20       constructed the Craig Road Landfill. In 2008, FGD residue, or gypsum, began  
21       to be produced as a byproduct of FGD technology. The gypsum byproduct is  
22       currently disposed of in the Craig Road Landfill or, if it meets specifications, is

1 sold to the drywall industry. An aerial image depicting the CCR storage areas  
 2 at Belews Creek is shown below.



3 **Figure 8 – Aerial showing CCR Units at Belews Creek (red line indicates**  
 4 **limits of the ash basin, yellow lines are the limits of landfills, green line is**  
 5 **the limit of the structural fill)**

1   **Q.    DOES THE CCR RULE REQUIRE CLOSURE OF THE BELEWS**  
2       **CREEK ASH BASIN?**

3    A.    Yes. The AAB failed to meet CCR Rule location restriction Criterion (1) –  
4           placement above the uppermost aquifer – in that the basin is located within five  
5           feet of the uppermost aquifer. In addition, the basin is unlined. Accordingly, the  
6           CCR Rule requires closure of the AAB at Belews Creek.

7   **Q.    WHAT CLOSURE METHODOLOGY IS THE COMPANY**  
8       **EMPLOYING WITH RESPECT TO THE BELEWS CREEK ASH**  
9       **BASIN?**

10   A.    The chosen closure methodology for the Belews Creek ash basin is closure-by-  
11          removal to an on-site landfill.

12   **Q.    WHY WAS THAT METHOD OF CLOSURE CHOSEN?**

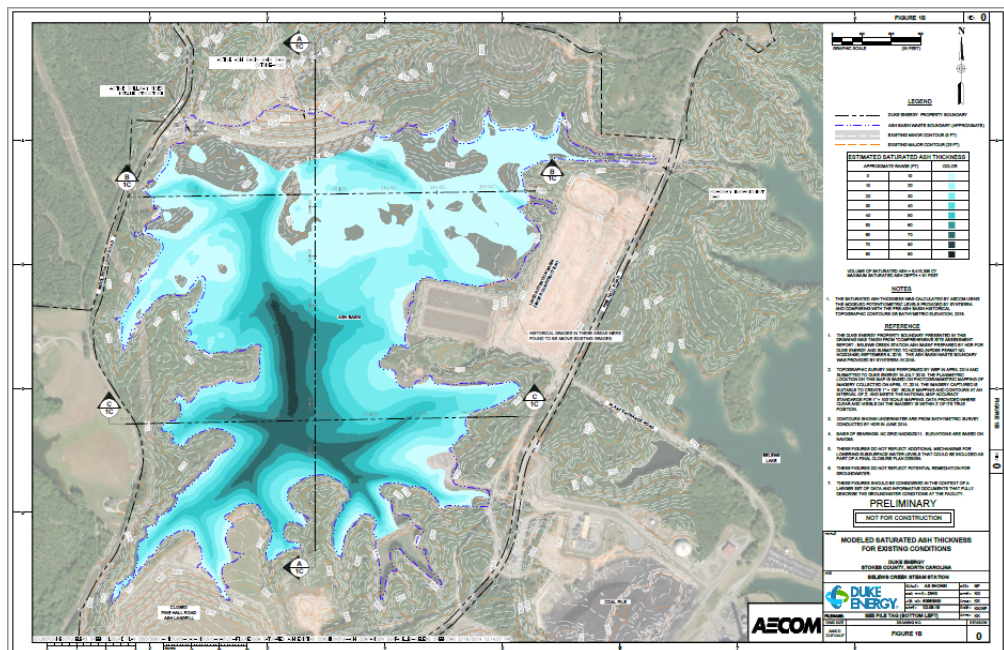
13   A.    The site-specific considerations driving selection of closure-by-removal at  
14          Belews Creek are very similar to those discussed previously for other DEC sites  
15          in my testimony. Specifically, the presence of ash in contact with groundwater  
16          in the basin, and the concerns expressed by the various regulatory agencies led  
17          to the decision to close the basin by excavation, a decision memorialized in the  
18          CCR Settlement the Company entered into with DEQ and the Community  
19          Groups.

20               And similar to those basins previously discussed, in order to meet the  
21          requirements of the CCR Rule, closure-by-removal is the most prudent and  
22          cost-effective method to achieve closure of the “valley-filled” Belews Creek  
23          ash basin, which contains ash in contact with groundwater, given the specific



geology of the site. As with the other ash basins referenced in my testimony, closure-in-place under the CCR Rule would require extensive engineering controls to meet the performance standard requiring closure to “control, minimize, or eliminate” ash in contact with groundwater.

As shown in Figure 9 below, the basin has the irregular fingers and irregular base characteristic of a “valley-filled” impoundment. The figure shows the depth of saturated ash in each basin based upon surveys conducted in 2018; the darker color represents a thicker layer of saturated ash, corresponding to deeper portions of the basin. As the figure shows, ash in the basin is in contact with groundwater, which again is characteristic of a “valley-filled” basin.



**Figure 9: Active Ash Basin at Belews, Saturated Ash Thickness (saturated ash thickness shown in blue in 10 ft. increments, max depth approx. 90 ft.)**

1           And once again, the Burns & McDonnell analysis indicated that a  
2           closure-in-place strategy would require the installation of targeted ISS  
3           throughout the basin. The Burns & McDonnell's estimate for a cap-in-place  
4           solution for basin closure, as shown in Table 2, is over two times greater than  
5           the Company's most recent estimate for basin closure: \$948 million versus  
6           \$344 million.

7           In addition, all of the other factors supporting closure-by-removal set  
8           out in my testimony regarding Belews Creek, as well as the testimony of  
9           Witness Williams, apply equally, such as elimination of the uncertainties  
10          associated with closure-in-place, including the unknown and potentially large  
11          costs, applies equally with respect to Belews as well.

12          Based upon all of these factors, it is my opinion that closure-by-removal  
13          is the more prudent and cost-effective course of action with respect to the CCR  
14          surface impoundment at Belews Creek.

15   **Q.   WHAT CLOSURE ACTIVITIES HAS THE COMPANY**  
16   **UNDERTAKEN AT BELEWS CREEK FOR WHICH IT IS SEEKING**  
17   **COST RECOVERY?**

18   A.   Since September 2018, the Company has engaged in numerous activities in  
19          order to meet its obligations to close the CCR units at Belews Creek, including:

- 20          •   Dewatering of the Ash Basin, including water treatment;
- 21          •   Clearing and developing soil borrow areas;
- 22          •   Designing a stability feature for the Pine Haul Road landfill to support basin
- 23          closure;



- 1 • Completed construction of new landfill cells 1 and 2 and began excavating
- 2 ash from the basin and placing in the landfill;
- 3 • Completed installation of phase 1 of the groundwater Corrective Action
- 4 Plan system and commenced full scale system construction; and
- 5 • Collecting and analyzing groundwater samples and preparing
- 6 environmental and engineering reports for State and Federal regulators.

7 **Q. WHAT COSTS HAS THE COMPANY INCURRED FOR WHICH IT IS**  
8 **SEEKING RECOVERY?**

9 A. The actual costs from September 2018 through September 2023 and the  
10 estimated costs from October 2023 through December 2023, on a system basis,  
11 are \$137 million. The amount allocated on a South Carolina retail basis is \$33  
12 million.

13 **E. ALLEN**

14 **Q. PLEASE PROVIDE A SITE HISTORY OF ALLEN.**

15 The Allen Steam Station coal-fired generation facility began commercial  
16 operations in 1957. The Company has operated five coal-fired units at Allen,  
17 the newest of which was built in 1961. Allen has two on-site ash basins that  
18 were constructed to receive CCR. The first ash basin, the Retired Ash Basin  
19 (“RAB”), was constructed in 1957 and received sluiced CCR until 1973. The  
20 second ash basin, the Active Ash Basin (“AAB”), was constructed in 1972.  
21 Additionally, there are four dry ash storage areas located above the western  
22 portion of the RAB, which are designated as Distribution of Residual Solids  
23 (“DORS”) areas and sometimes also called the Ash Fill Areas or Ash Storage

1 Areas. The CCR contained in the DORS areas was dredged from the AAB from  
 2 1995 through 2006 in order to extend its useful life.

3 In 2009, the Allen Plant replaced its fly ash sluicing operation with a  
 4 FGD facility. Also in 2009, DEC received a permit from NC DEQ to construct  
 5 an on-site, lined landfill on top of the RAB. This landfill, the Retired Ash Basin  
 6 Landfill, receives dry fly ash generated by the Allen Plant's coal-fired units.  
 7 The AAB ceased receiving CCR from the coal fired units in March 2019. An  
 8 aerial view of the Allen CCR units is provided below.



9 **Figure 10 – Aerial showing CCR Units at Allen (red line is the limits of the**  
 10 **AAB, orange line is the limits of the RAB, green lines are the limits of the**  
 11 **DORS areas and the RAB Landfill)**

1   **Q.    DOES THE CCR RULE REQUIRE CLOSURE OF THE ALLEN ASH**  
2   **BASINS?**

3   A.    Yes. Both the RAB and the AAB failed to meet CCR Rule location restriction  
4        Criterion (1) – placement above the uppermost aquifer – in that both basins  
5        are located within five feet of the uppermost aquifer. In addition, neither basin  
6        is lined. Accordingly, the CCR Rule requires closure of all the basins at Allen.

7   **Q.    WHAT CLOSURE METHODOLOGY IS THE COMPANY**  
8   **EMPLOYING WITH RESPECT TO THE ALLEN ASH BASINS?**

9   A.    The chosen closure methodology for the Allen ash basins is closure-by-removal  
10       to an on-site landfill.

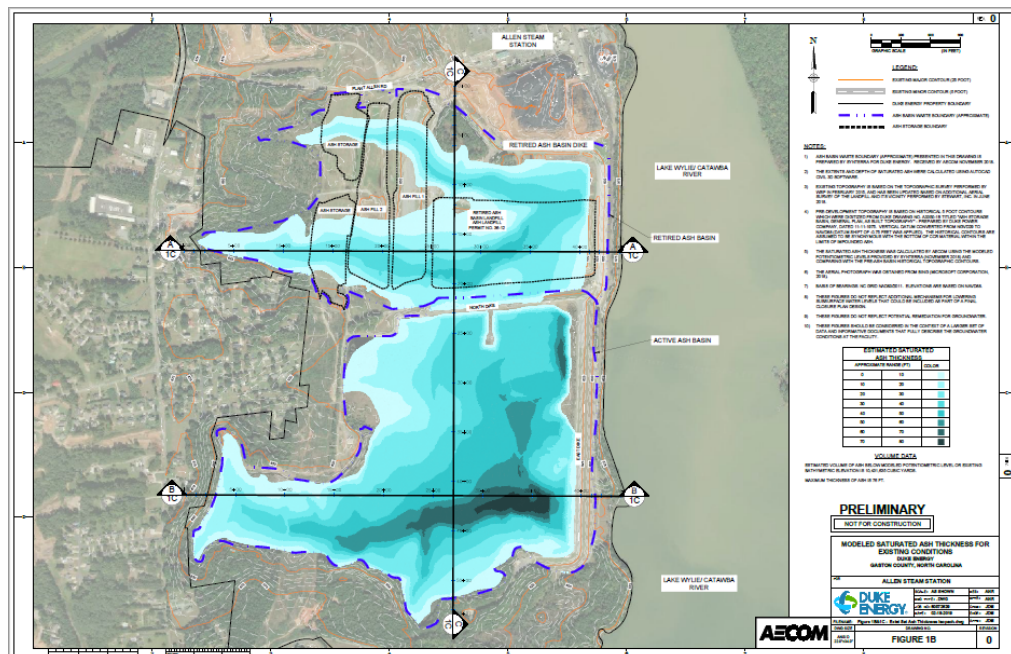
11   **Q.    WHY WAS THAT METHOD OF CLOSURE CHOSEN?**

12   A.    The site-specific considerations driving selection of closure-by-removal at  
13       Allen are similar to those discussed previously for other DEC sites in my  
14       testimony – specifically, the presence of ash in contact with groundwater in the  
15       basins, and the concerns expressed by the various regulatory agencies – led to  
16       the decision to close the basin by excavation, and for Allen that decision was  
17       also memorialized in the CCR Settlement the Company entered into with DEQ  
18       and the Community Groups.

19               And similar to those basins previously discussed, in order to meet the  
20       requirements of the CCR Rule, closure-by-removal is the most prudent and  
21       cost-effective method to achieve closure of the “valley-filled” Allen ash basins,  
22       which contain ash in contact with groundwater, given the specific geology of  
23       the site. As with the other ash basins referenced in my testimony, closure-in-

place under the CCR Rule would require extensive engineering controls to meet the performance standard requiring closure to “control, minimize, or eliminate” ash in contact with groundwater.

As shown in Figure 11 below, the basins have the irregular fingers and irregular base characteristic of a “valley-filled” impoundment. The figure shows the depth of saturated ash in each basin based upon surveys conducted in 2018; the darker color represents a thicker layer of saturated ash, corresponding to deeper portions of the basin. As the figure shows, ash in the basin is in contact with groundwater, which again is characteristic of a “valley-filled” basin.



**Figure 11: Allen Ash Basins, Saturated Ash Thickness (saturated ash thickness shown in blue in 10 ft. increments, max depth approx. 80 ft.)**

And once again, the Burns & McDonnell analysis indicated that a closure-in-place strategy would require the installation of targeted ISS

1 throughout the basin. The Burns & McDonnell's estimate for a cap-in-place  
2 solution for basin closure, as shown in Table 2, is almost two times greater than  
3 the Company's most recent estimate for basin closure: \$842 million versus  
4 \$514 million.

5 In addition, all of the other factors supporting closure-by-removal set  
6 out in my testimony regarding Allen, as well as the testimony of Witness  
7 Williams, apply equally, such as elimination of the uncertainties associated with  
8 closure-in-place, including the unknown and potentially large costs, applies  
9 equally with respect to Allen as well.

10 Based upon all of these factors, it is my opinion that closure-by-removal  
11 is the more prudent and cost-effective course of action with respect to the CCR  
12 surface impoundments at Allen.

13 **Q. WHAT CLOSURE ACTIVITIES HAS THE COMPANY**  
14 **UNDERTAKEN AT ALLEN FOR WHICH IT IS SEEKING COST**  
15 **RECOVERY?**

16 A. Since September 1, 2018, the Company has engaged in numerous activities in  
17 order to meet its obligation to close the CCR units at Allen, including:

- 18 • Completed construction of a stormwater diversion project to reduce  
19 stormwater flows to the AAB;
- 20 • Installed a water treatment system and continued maintaining and operating  
21 the ash basin dewatering system;
- 22 • Completed phase 1 of the groundwater Corrective Action Plan system and  
23 commended construction of phase 2;

- 1           • Received the permit to construct and began construction of the North Starter
- 2           Landfill (“NSLF”) and the South Starter Landfill (“SSLF”);
- 3           • Completed construction of the leachate basin;
- 4           • Designing and permitting work for the Ash Basin Landfill (“ABLF”).
- 5           • Obtaining the permit to operate the NSLF and commencing ash placement
- 6           from the RAB and AAB; and
- 7           • Collecting and analyzing groundwater samples and preparing
- 8           environmental and engineering reports for State and Federal regulators.

9   **Q.   WHAT COSTS HAS THE COMPANY INCURRED FOR WHICH IT IS**  
10 **SEEKING RECOVERY?**

11   A.   The actual costs from September 2018 through September 2023 and the  
12       estimated costs from October 2023 through December 2023, on a system basis,  
13       are \$120 million. The amount allocated on a South Carolina retail basis is \$28  
14       million.

15   **F.   DAN RIVER**

16 **Q.   PLEASE PROVIDE A SITE HISTORY OF DAN RIVER.**

17   A.   The Dan River Steam Station was a coal-fired generation station that began  
18       operations in 1949. The three coal-fired units were retired in 2012 and replaced  
19       with a 620-MW natural gas facility. CCR from the coal-fired units were stored  
20       on-site in four areas: Primary Ash Basin (“PAB”), Secondary Ash Basin  
21       (“SAB”), Ash Fill 1, and Ash Fill 2. The PAB was constructed in 1956 to  
22       receive sluiced CCR for storage and disposal. In 1968, the Company expanded  
23       the original ash basin to cover the area later occupied by the SAB. In 1980, the



1 Company constructed two on-site dry storage areas, Ash Fill 1 and Ash Fill 2,  
 2 north of the PAB and SAB. These ash fill areas served as a place for ash to be  
 3 relocated from the PAB and SAB to extend their service life. An aerial view  
 4 of the Dan River Station that shows the locations of the CCR units is below.



5  
 6 **Figure 12: Aerial showing CCR Units at Dan River (red lines indicated**  
 7 **limits of the units)**

8 **Q. DOES THE CCR RULE REQUIRE CLOSURE OF THE ASH BASINS**  
 9 **AT DAN RIVER?**

10 A. Yes. Both ash basins fail to meet CCR Rule location restriction Criterion (1) –  
 11 placement above the uppermost aquifer – in that both basins are located within  
 12 five feet of the uppermost aquifer. In addition, neither basin is lined.

13 Accordingly, the CCR Rule requires closure of both basins at Dan River.

1   **Q.     WHAT CLOSURE METHODOLOGY DID THE COMPANY EMPLOY**  
2       **WITH RESPECT TO THE DAN RIVER ASH BASINS?**

3   A.     The chosen closure methodology for the Dan River ash basins was closure-by-  
4           removal, *i.e.*, excavation, with the bulk of the ash going to a newly constructed  
5           on-site landfill, some ash transported by rail to the Amelia Landfill in Jetersville  
6           Virginia, and some ash transported by truck to Roanoke Cement for beneficial  
7           use. The costs in this case, covering September 2018 through December 2023,  
8           do not include any transportation or disposal costs for off-site disposal.

9   **Q.     WHY WAS THAT METHOD OF CLOSURE CHOSEN?**

10  A.     Dan River is classified under CAMA as a “high risk” site, and such sites must  
11           be closed by removal. But in addition, and even in the absence of CAMA, site-  
12           specific conditions at Dan River make it clear that closure-by-removal was the  
13           more prudent and cost-effective closure method consistent with the  
14           requirements of the CCR Rule.

15           At both Dan River basins, ash was in contact with groundwater, and as  
16           discussed previously for other DEC sites in my testimony – specifically, the  
17           presence of ash in contact with groundwater in the basins, and the concerns  
18           expressed by the various regulatory agencies – led to the decision to close the  
19           basin by excavation. And again, as with the other DEC sites referenced in my  
20           testimony, since ash is in contact with groundwater, as shown in Figure 2, were  
21           cap-in-place closure to be employed under the CCR Rule, extensive  
22           engineering controls so as to “control, minimize, or eliminate” ash in contact  
23           with groundwater would be required.



1           The Burns & McDonnell closure-in-place evaluation included the  
2           installation of targeted ISS throughout both the PAB and SAB, as the  
3           underlying geology would not allow for a hydraulic separation between  
4           groundwater and the base of the basins. Burns & McDonnell's estimate for a  
5           cap-in-place solution for basin closure at the site, covering both basins, is  
6           greater than what the Company spent for basin closure: \$219 million versus  
7           \$198 million.

8   **Q.   WHAT CLOSURE ACTIVITIES HAS THE COMPANY**  
9   **UNDERTAKEN AT DAN RIVER FOR WHICH IT IS SEEKING COST**  
10 **RECOVERY?**

11   A.   Since September 2018, the Company has engaged in numerous activities in  
12       order to meet its obligations to close the CCR surface impoundments at Dan  
13       River, including:

- 14       • Completed excavation and final grading of the PAB, SAB, and Ash Fill
- 15       Areas;
- 16       • Closed the on-site ash landfill;
- 17       • Sent (and continue to send) leachate from the on-site landfill to the City of
- 18       Eden for processing;
- 19       • Demobilized from the site and commenced post-closure care activities as
- 20       required by the post-closure plan;
- 21       • Operating and maintaining groundwater monitoring wells; and
- 22       • Collecting and analyzing groundwater samples and preparing
- 23       environmental and engineering reports for State and Federal regulators.

1   **Q.     WHAT COSTS HAS THE COMPANY INCURRED FOR WHICH IT IS**  
2       **SEEKING RECOVERY?**

3   A.     The actual costs from September 2018 through September 2023 and the  
4       estimated costs from October 2023 through December 2023, on a system basis,  
5       are \$76 million. The amount allocated on a South Carolina retail basis is \$18  
6       million.

7       **G.     BUCK**

8   **Q.     PLEASE PROVIDE A SITE HISTORY OF BUCK.**

9   A.     The Buck Steam Station began commercial operations in 1926. All of the coal-  
10       fired units at Buck have been retired. The Company currently operates a 620  
11       MW natural gas facility at Buck, which came online in 2011. The first CCR  
12       basin at the Buck Plant, referred to as Basin 3, was formed in 1956 by  
13       constructing a dam across a tributary to the Yadkin River. In 1977, the Company  
14       increased its CCR storage capacity at Buck by raising the main dam that formed  
15       Basin 3 and constructing a divider dam to create Basin 2. In 1982, DEC began  
16       construction of Basin 1 to provide more storage for sluiced CCR. In 2009,  
17       approximately 200,000 cubic yards of CCR was excavated from Basin 1 and  
18       placed within an on-site dry ash storage area to create additional capacity for  
19       sluiced coal ash. DEC ceased sluicing CCR to the ash basins at Buck in 2013,  
20       however, other wastewater flows continued going to the Ash Basins until 2018.  
21       An aerial view depicting the CCR basins at Buck is provided below.



**Figure 13 – Aerial showing CCR Units at Buck (yellow lines indicate limits of the basins)**

**Q. DOES THE CCR RULE REQUIRE CLOSURE OF THE ASH BASINS AT BUCK?**

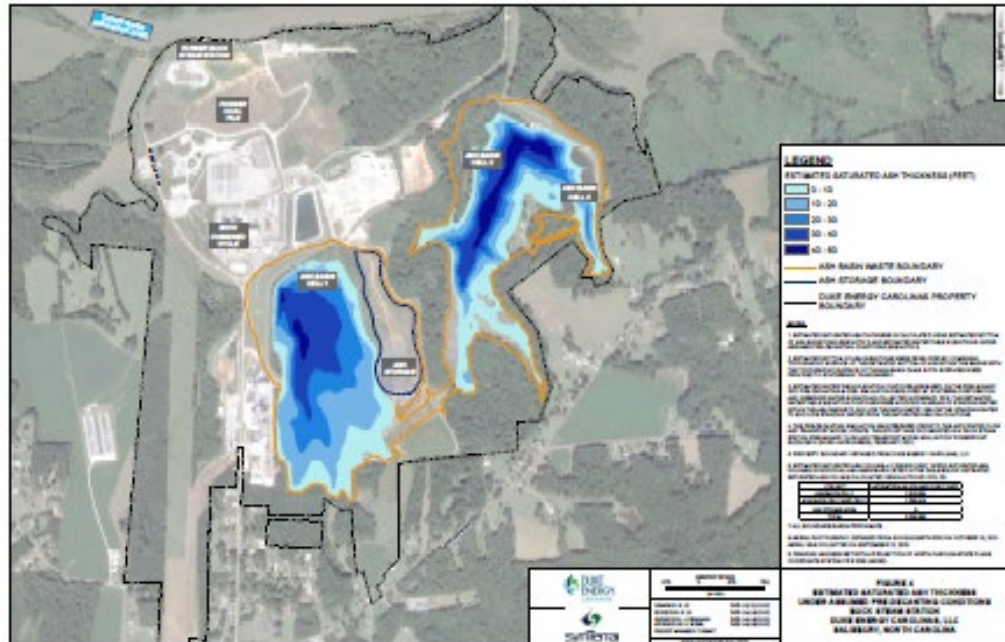
A. Yes. All three basins fail to meet CCR Rule location restriction Criterion (1) – placement above the uppermost aquifer – in that they are located within five feet of the uppermost aquifer. Basin's 1 and 3 also fail Criterion (2) - wetlands – in that both basins are constructed in a wetlands area. In addition, none of the basins are lined. Accordingly, the CCR Rule requires closure of all of the basins at Buck.

**Q. WHAT CLOSURE METHODOLOGY IS THE COMPANY EMPLOYING WITH RESPECT TO THE BUCK ASH BASINS?**

A. The chosen closure methodology for the basins is closure-by-removal. The ash is being processed on-site for beneficial reuse.

1 **Q. WHY WAS EXCAVATION CHOSEN AS THE SELECTED METHOD**  
 2 **FOR CLOSING THE BUCK ASH BASINS?**

3 A. The site-specific considerations driving selection of closure-by-removal at  
 4 Buck are similar to those discussed previously for other DEC sites in my  
 5 testimony – specifically, the presence of ash in contact with groundwater in the  
 6 basins, and the concerns expressed by the various regulatory agencies – led to  
 7 the decision to close the basins by excavation. Figure 14 below shows the depth  
 8 of saturated ash in each basin based upon surveys conducted in 2018; the darker  
 9 color represents a thicker layer of saturated ash, corresponding to deeper  
 10 portions of the basin. As the figure shows, ash in the basin is in contact with  
 11 groundwater, which again is characteristic of a “valley-filled” basin.



12 **Figure 14: Buck Ash Basins, Saturated ash Thickness as of 2018 (saturated**  
 13 **ash thickness shown in blue in 10 ft. increments, max depth approx. 50 ft.)**

1           In addition, all of the other factors supporting closure-by-removal set  
2           out in my previous testimony, as well as the testimony of Witness Williams,  
3           such as elimination of the uncertainties associated with closure-in-place,  
4           including the unknown and potentially large costs, applies equally with respect  
5           to Buck as well. Based upon all of these factors, it is my opinion that closure-  
6           by-removal is the more prudent course of action with respect to the CCR surface  
7           impoundments at Buck.

8   **Q.   WHY WAS BENEFICIAL REUSE SELECTED AS THE DISPOSAL**  
9   **METHOD FOR THE ASH AT THE BUCK SITE?**

10  A.   Buck was selected by the Company as one of three DEP/DEC locations to  
11       construct and operate a beneficiation plant. The plant utilizes STAR®  
12       technology developed by a South Carolina company, SEFA Group, and  
13       previously implemented at several sites owned and operated by two different  
14       South Carolina electric utilities, Santee Cooper and SCE&G. STAR®  
15       technology processes the ash into a product that can be beneficially used as an  
16       additive in concrete.

17               Several factors lead to the decision for selecting Buck as a site for  
18       beneficiation and reuse. These factors included carbon content of the ash within  
19       the basins, ash inventory volume at the site, site location relative to product  
20       market, and cost savings comparisons.

21               In addition, excavation to an on-site landfill was not a feasible option at  
22       Buck due to limited greenfield space and landfill siting restrictions. Basin 1 was  
23       initially identified as a potential location for an on-site landfill; however, the

1 need for double handling and temporary storage of ash, for which there was a  
2 lack of space, rendered this option not feasible.

3 As an on-site landfill was not a feasible option, the Company requested  
4 that Burns & McDonnell develop a cost estimate to dispose of the ash in an off-  
5 site landfill. The cost is greater than what the Company is estimating to excavate  
6 and beneficially reuse the ash: \$811 million versus \$473 million.

7 We also asked Burns & McDonnell to perform a closure-in-place  
8 evaluation for Buck, with required engineering controls. These controls include  
9 the installation of targeted ISS throughout all of the ash basins, as the underlying  
10 geology does not allow for a hydraulic separation between groundwater and the  
11 base of the basins. As shown by Table 2, the Burns & McDonnell's estimate for  
12 a cap-in-place solution for basin closure at the site, covering both basins, is only  
13 \$2 million less than what the Company is estimating to excavate and  
14 beneficially reuse the ash: \$471 million versus \$473 million. This \$2 million  
15 difference should be viewed in light of the reduction of future risk through the  
16 removal of the ash from the site. As noted above and in the testimony of  
17 Witness Williams, elimination of the uncertainties associated with closure-in-  
18 place, including unknown and potentially large costs, is a factor that must be  
19 taken into account when the differential in the competing cost estimates is that  
20 small – the prospect that future costs, presently unknowable, closing that small  
21 a gap is very real. In addition, if the revenue from the beneficiated ash continues  
22 to increase, as it has from the start of the Buck STAR® plant's operation, the  
23 \$2 million difference will continue to reduce or even reverse.

1    **Q.    WHAT CLOSURE ACTIVITIES HAS THE COMPANY**  
2           **UNDERTAKEN AT BUCK FOR WHICH IT IS SEEKING COST**  
3           **RECOVERY?**

4    A.    Since September 1, 2018, the Company has engaged in numerous activities in  
5           order to meet its obligation to close the CCR surface impoundments at Buck,  
6           including:

- 7           • Completed construction of the STAR® unit (entered into service in August  
8           2020);
- 9           • Completed construction or expansion of haul roads to support hauling CCR  
10           to the STAR® unit, including a wheel wash;
- 11           • Excavating and hauling of Basin 1 and Basin 2 ash to the STAR® unit;
- 12           • Excavating and hauling of Basin 1 and Basin 2 ash to Roanoke Cement for  
13           beneficial use;
- 14           • Operating the ash basin dewatering and treatment systems to maintain the  
15           ash basins in a dewatered state;
- 16           • Hauling co-mingled and CCR materials that do not meet STAR® processing  
17           specifications to an off-site landfill for disposal or for beneficial reuse at  
18           Roanoke Cement; and
- 19           • Collecting and analyzing groundwater samples and preparing  
20           environmental and engineering reports for State and Federal regulators.

1 **Q. WHAT COSTS HAS THE COMPANY INCURRED FOR WHICH IT IS**  
 2 **SEEKING RECOVERY?**

3 A. The actual costs from September 2018 through September 2023 and the  
 4 estimated costs from October 2023 through December 2023, on a system basis,  
 5 are \$241 million. The amount allocated on a South Carolina retail basis is \$57  
 6 million.

7 **IV. RECOVERY OF PREVIOUSLY DISALLOWED COSTS**

8 **Q. WHAT CLOSURE COSTS, PROVISIONALLY DISALLOWED BY THE**  
 9 **COMMISSION IN THE COMPANY'S PREVIOUS RATE CASE, ARE**  
 10 **BEING SOUGHT FOR RECOVERY IN THIS CASE?**

11 A. In DEC's previous rate case, the Commission disallowed, on a provisional  
 12 basis, certain costs related to ash basin closure at Dan River and Buck, as set  
 13 forth in Table 3 (on a system and South Carolina retail basis):

14 **Table 3: Previous Provisionally Disallowed Costs (in millions)**

<b>Site</b>	<b>Previous Costs Provisionally Disallowed System Level</b>	<b>Previous Costs Provisionally Disallowed SC Retail Level</b>
Buck	\$37	\$9
Dan River	\$117	\$27
<b>Total</b>	<b>\$153</b>	<b>\$36</b>

15 My testimony in this case shows that the Company is now entitled to obtain  
 16 recovery of these costs.



1   **Q.   WHY IS RECOVERY OF THE PROVISIONALLY DISALLOWED**  
2       **COSTS APPROPRIATE IN THIS CASE?**

3   A.   My testimony and the testimony of Witness Williams demonstrate that the  
4       conditions articulated by ORS Witness Wittliff in the Company's previous rate  
5       case for recovery of previously disallowed costs have been met, in that there  
6       has been a significant change in circumstances since the Commission's decision  
7       in the previous case. Change in circumstance is the trigger that the South  
8       Carolina Supreme Court itself referenced in upholding the provisional  
9       disallowance in the previous case. Accordingly, recovery of the previously  
10      disallowed costs is appropriate now.

11   **Q.   PLEASE ELABORATE.**

12   A.   First, ORS Witness Wittliff stated in DEC's previous case that DEC was not  
13      necessarily precluded from seeking recovery in future proceedings the costs he  
14      recommended be disallowed in the 2018 case. He testified "If DEC can  
15      demonstrate that it has prudently incurred expenses dictated by compliance with  
16      the CCR Rule as they stand at the time of its next rate case, any expenses  
17      required by the CCR Rule as a stand-alone document (i.e., absent CAMA) and  
18      determined to be prudently incurred should be considered for recovery in that  
19      forum." (Tr. Vol. 6, p. 1340-40). And in upholding the Commission's Order  
20      disallowing Riverbend and Buck costs, the South Carolina Supreme Court,  
21      noted that the Commission "emphasized several times that ... [its cost  
22      disallowance] was only its decision '*at this time*,' and that future developments

1           could change its position.” *Duke Energy Carolinas, LLC v. S.C. Off. of Regul.*  
2           *Staff*, 434 S.C. 392, 412, 864 S.E.2d 873 (2021) (emphasis added).

3           Second, the “future developments” of which the Supreme Court spoke  
4           have come to pass, and have been confirmed by EPA itself in multiple  
5           communications that post-date the Commission’s decision in the Company’s  
6           prior case, including the Gavin determination previously described in my  
7           testimony and EPA’s recently proposed revision to the CCR rule to cover legacy  
8           impoundments.

9           As further detailed in Witness Williams’ testimony, EPA has reaffirmed  
10          its interpretation in its proposal to deny the application from Alabama to  
11          implement its permit program in lieu of the federal CCR Rule. 88 Federal  
12          Register 55220 (August 14, 2023). EPA provided significant detail explaining  
13          its rationale, stating that its review of a state program considered not only the  
14          language of the state CCR regulation, but the documentation utilized by the  
15          state to demonstrate that the site-specific conditions in each state CCR unit  
16          permit were equal to or more protective than what would be required by the  
17          specific design requirements and the general performance standards included in  
18          the CCR Rule. Based on its review, EPA determined that the Alabama permit  
19          program did not meet the criteria for approval as the Alabama permit program  
20          was not as protective as the federal CCR regulations. EPA specifically cited its  
21          concerns with the protectiveness of Alabama’s permit provisions addressing  
22          closure requirements, groundwater monitoring, and corrective action.

1 EPA's action vis-à-vis Alabama should be viewed with the backdrop of  
2 another EPA communication, this time to the Alabama Department of  
3 Environmental Management ("ADEM") on September 15, 2022. In  
4 commenting on a permit issued by ADEM for the closure of an ash pond at a  
5 TVA plant site, EPA noted (Comment 2) that while the pond had already been  
6 "certified as closed" the closure did not appear to be in compliance with the  
7 CCR Rule, because EPA's information indicated that post-closure "substantial  
8 amounts of CCR continue to be in contact with liquids even after closure  
9 activities have been completed." In other words, EPA was signaling that unless  
10 the measures it indicated were necessary were taken in close-in-place basin  
11 closure, there was a distinct prospect that rework would be required.

12 These developments confirm, as both Witness Williams' testimony and  
13 my testimony describe that, for a closure-in-place solution where ash in the  
14 CCR unit is in contact with groundwater, EPA's interpretation of the CCR Rule  
15 will require extensive (and potentially expensive) engineering controls to keep  
16 the ash that remains in the ground separated from groundwater. The  
17 Commission's past disallowance did not factor this development into the  
18 equation at all, as EPA had not at the time articulated it with sufficient clarity.  
19 Now that it has done so, and given that my cost comparison analysis of closure-  
20 in-place costs versus what the Company is actually doing shows that what the  
21 Company is actually doing is (a) less costly than closure-in-place with respect  
22 to Dan River, and (b) roughly equivalent in cost to closure-in-place at Buck,  
23 the Commission should undertake further review of the previously disallowed

costs. Upon that further review, the Commission should reinstate those costs and allow their recovery in this case, since the Company has executed the most prudent methodologies to close the basins at Buck and Dan River – methodologies that meet the requirements of the Federal CCR rule, are cost-effective, and reduce future risk.

**V. COMPLIANCE SPEND ESTIMATES OVER THE NEXT FIVE YEARS**

**Q. IN SUPPORT OF THE COMPANY’S REQUEST FOR CONTINUED DEFERRAL OF COAL ASH COSTS, WHAT IS THE ESTIMATED COMPLIANCE SPEND AT DEC’S COAL ASH SITES OVER THE NEXT FIVE YEARS?**

A. As previously mentioned, the Company maintains budgets that are updated quarterly to incorporate the knowledge and experience the Company has gained during the project, as well as to incorporate scope changes or estimate deviations. Based upon the third quarter 2023 review, the estimated total compliance spend for 2024-2028 is as follows:

**Table 4: Estimated Compliance Spend, 2024-2028 (in millions)**

Site	Estimated Compliance Spend 2024-2028 System Level	Estimated Compliance Spend 2024-2028 SC Retail Level
Allen	\$241	\$56
Belews Creek	\$198	\$48
Buck	\$118	\$28
Cliffside	\$140	\$33
Dan River	\$4	\$0.9
Marshall	\$270	\$64
W.S. Lee	\$77	\$18

Riverbend	\$5	\$1.2
<b>Total</b>	<b>\$1,053</b>	<b>\$249</b>

1        These estimates do not include any additional compliance requirements that  
2        may be required based upon the final revised Federal CCR rule, which, as  
3        indicated in footnote 4, is expected to be issued in 2024.

4 VI. CONCLUSION

5     **Q. TO RECAP, WHAT COSTS ASSOCIATED WITH BASIN CLOSURE IS**  
6     **THE COMPANY SEEKING TO RECOVER IN THIS PROCEEDING?**

7 A. The site-by-site costs sought for recovery, including previously provisionally  
8 disallowed costs that I have shown are now ripe for recovery, are as follows:

9 **Table 5: Cost Summary Table (in millions)**

Site	Costs (Actual 9/18-9/23 & Forecast 10/23- 12/23) System Level <sup>13</sup>	Previous Costs Dis- allowed System Level	<b>Total System Level Costs</b>	Costs (Actual 9/18-9/23 & Forecast 10/23- 12/23) SC Retail Level	Previous Costs Dis- allowed SC Retail Level	<b>Total SC Retail Level Costs</b>
Allen	\$120	-	<b>\$120</b>	\$28	-	<b>\$28</b>
Belews Creek	\$137	-	<b>\$137</b>	\$33	-	<b>\$33</b>
Buck	\$241	\$37	<b>\$278</b>	\$57	\$9	<b>\$65</b>
Cliffside	\$126	-	<b>\$126</b>	\$30	-	<b>\$30</b>
Dan River	\$76	\$117	<b>\$192</b>	\$18	\$27	<b>\$45</b>
Marshall	\$204	-	<b>\$204</b>	\$48	-	<b>\$48</b>
WS Lee (SC)	\$89	-	<b>\$89</b>	\$21	-	<b>\$21</b>
Total	\$994	\$153	<b>\$1,147</b>	\$235	\$36	<b>\$271</b>

<sup>13</sup> Actual costs incurred after September 30, 2023, will be updated in supplemental testimony.

1       As I demonstrate throughout my testimony, the costs incurred in connection  
2       with CCR basin closure at these plants were reasonably and prudently incurred  
3       by the Company in order to meet its obligations under applicable laws and  
4       regulations, to which the Company is subject, and with which the Company  
5       must comply – indeed, failure to comply is simply not an option for the  
6       Company. Accordingly, the Company is entitled to recovery of the coal ash  
7       basin closure costs which it seeks in this proceeding.

8   **Q.    DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

9   **A.    Yes.**